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Bradshaw Lecture

ON

THE SURGERY OF THE HEART.

Delivered before the Royal College of Surgeons of England on Dec. 11th, 1919,

BY SIR CHARLES BALLANCE, K.C.M.G., C.B., M.V.O., M.S. LOND., F.R.C.S. ENG.,
CONSULTING SURGEON TO ST. THOMAS'S HOSPITAL, ETC.

(Continued from p. 5.)

II.—THE SURGERY OF THE HEART.

THE operations now practised on the heart are: 1. Paracentesis—pericardiotomy. 2. Paracentesis of the right auricle and ventricle. 3. Operation for air embolism of the heart. 4. Cardiac stimulation for arrest of the movement of the heart. 5. Cardiolysis. 6. Operation for injury of the heart itself. Cardiorrhaphy.

1. PARACENTESIS AND PERICARDIOTOMY.

Paracentesis pericardii was first advocated by Riolanus (1649) and trephining the sternum (Riolan's method) was done by Skielderup (1818) and by Malle (1871); but such a severe operation is altogether unnecessary. Trousseau established the method of open incision in France, though Dieulafoy advocated aspiration. Clifford Allbutt (1866), a pupil of Trousseau, persuaded Wheelhouse to tap a pericardium much distended in the course of an attack of rheumatic fever. The patient was dying, and Clifford Allbutt got Wheelhouse out of bed to do the operation.[1] Recovery ensued. This was the first case of the kind in England, and the news of it was quickly followed by the publication of similar cases by Bowditch of the United States, Roberts of Manchester, and many others.

The operation of paracentesis pericardii, or aspiration of the pericardium, should be, I think, banished from surgical practice; just as puncture of the distended abdomen is no longer done in cases of obstruction. It is a leap in the dark, and many cases of wound of the heart or coronary artery have occurred in the course of this operation.[2] Free and safe exposure of the pericardium can be obtained by removing the sternal ends of the left sixth and seventh cartilages. The internal mammary artery must be drawn aside or tied and the triangularis sterni divided. The pulp of the surgeon's finger must be able to examine the pericardium before an incision is made. The knife should be employed to open the pericardial sac. The abundant literature that has accumulated, and the diversity of opinion as to the best site for puncture is of itself evidence that paracentesis is neither simple nor safe.

Trousseau graphically describes the signs and symptoms of gradual distension of the pericardium with fluid. The following is a paraphrase:—

There is great oppression of the breathing and the facial anxiety increases from day to day. The pericardial dullness soon covers a wide area. It extends from beyond the right edge of the sternum to 3 or 4 cm. outside the nipple line and in the vertical direction from the third rib to the diaphragm. The precordial region is arched. The pulsations of the heart become obscure and muffled as if distant, and finally cease to be heard. The pulse is small and rapid. At the end of a few weeks the dyspnœa is extreme, the patient cannot lie down, the lips are blue, the skin cold and livid, the extremities œdematous, and the face puffy. There is no albuminuria.

Pericardiotomy.

A limited pericardiotomy is the operation of choice for hydrops. A point to remember is that the operator may not know in some cases before incising the pericardium whether the fluid within is serous, bloody, or purulent. Voinitch[3] recommends the resection of the left sixth and seventh cartilages and the adjoining edge of the sternum, thus opening up the costo-xiphoid angle and the costo-sternal interval in the diaphragm. The exposure seems unnecessarily wide for the relief of hydrops, but the point to emphasise is that the lower the opening in the pericardium the better the drainage. I agree with Matas that the lower the point selected for drainage the less likelihood is there of danger to the pleura and heart, and that it is well to strike the pericardial effusion where it is largest and most dependent. The danger of wounding the pleura in pericardiotomy is non-existent with moderate skill on the part of the operator. The idea is a relic of a bygone age of surgery.[4] The pleural edge can easily be displaced by gentle gauze manipulation. My experience of the treatment of aneurysm and tumour at the root of the neck is confirmatory of this statement. The exception is the case of a malignant tumour to which the pleura is adherent. If the pleura is opened the opening should be closed and at the termination of the operation the air in the pleura should be aspirated so as to allow the lung to expand. In an operation on the heart of a dog this always has to be done, because in this animal the heart cannot be reached except by the transpleural route.

Baron Larrey's[5] case is of great interest because it is clear that it led him to experiment and to devise a new operation which anticipated Allingham's suggestion by about 90 years.

Larrey's patient was a man, aged 30, who stabbed himself with a knife in the left side of the chest; the pericardium and the left lung were wounded, the knife had passed through the fifth costal cartilage and was still in the wound when he was brought to hospital. Frothy blood escaped in jets with each systole. The knife was withdrawn and the wound dressed with plaster; the patient tore off the dressing and it was reapplied. The pulse was rapid and there was grave dyspnœa. Bleeding gave some relief. Some improvement took place, but later on he became worse, and in great distress requested Larrey either to open his chest or to give him a narcotic strong enough to send him to sleep. Operation 45 days after injury, incision through skin and cellular tissue in fifth space below nipple, carefully carried deeper until pericardium felt. With the left index finger on the pericardium as a guide an incision into the pericardium was made with a bistoury, the finger inserted, and the apex of the heart felt. About a litre of fluid with some blood clot escaped. Great relief. In ten days the wound closed and the

[1] Private letter from Sir T. Clifford Allbutt.

[2] Some cases are recorded in Mr. Stephen Paget's admirable Surgery of the Heart, 1896, and there are many others in surgical literature.

[3] Voinitch contributed in 1897 a careful study of the variations in the normal position of the anterior margins of the pleuræ, especially with reference to operation on the pericardium. His paper is illustrated by numerous figures. He finds that there is a triangle of safety, so that the sternal portions of the left sixth and seventh cartilages can be removed without any risk to the pleura. Lietopsis Ruskoi Khirurgia, 1897, p. 805, Fig. 88.

[4] "The artificial separation of the normal pleura is usually possible, and in pyopericarditis is always to be attempted by the surgeon in order that the underlying pericardium may be divided and the abscess material be evacuated without risk of pleural contamination. Delorme and Mignon maintain that fluid distension of the pericardium has little effect in displacing the median pleural reflection outward; but Glück and Curschmann take the opposite view. Drainage in children may be interfered with by infection of the anterior mediastinum." Eliot: Cases of Suppurative Pericarditis. Annals of Surgery, 1909, p. 60.

[5] Bulletin des Sciences Méd., vol. vi. (1810) and Clinique Chi. (1829), vol. ii.

symptoms recurred. Wound reopened with a probe, 4 oz. of pus escaped. Considerable improvement. Death 68 days after injury and 23 after operation. Autopsy: Suppurative mediastino-pericarditis.

Remarks by Larrey.[6]

"In pericardial effusion ..... I should carry out the operation at the most dependent point of the pouch formed by that membrane, and this point, which may be termed the seat of election, corresponds, as we have said, to the interval between the left side of the base of the xiphoid and the united ends of the seventh and eighth left costal cartilages. It is in this triangular cellular space that an oblique incision may confidently be made from the junction of the seventh costal cartilage with the sternum along its inferior border as far as the end of the eighth costal cartilage, which is closely united by fibrous tissue to the seventh costal cartilage. In this incision, which divides some fibres of the first digitation of the rectus and of the external oblique, is included the lamellar fibrous tissue which is continuous with that which is called the false layer of the peritoneum, on division of which the prominent point of the pericardium, appearing in the interspace between the first two digitations of the diaphragm, is encountered. The point of the bistoury carried carefully upwards and a little from right to left will enter the pericardium without opening the peritoneum. A small portion of the anterior border of the diaphragm is just cut as it is attached to the posterior surface of the seventh cartilage. No important vessel is met with.

"Thus this operation, easy to execute, is of all the methods the least likely to wound the heart, and offers the greatest chances of success."

He adds in a footnote:

"The patient should be seated on the edge of his bed and should have something to lean against, because in this perpendicular position the anterior border of the base of the pericardium is more inclined forwards, and in consequence more accessible to the instrument."

The advantages of the operation, according to Larrey, are as follows:—

1. At this point the inner surface of the pericardium is the further away from the heart, the greater the amount of fluid in the cavity.

2. The opening being dependent the fluid escapes more easily and without embarrassing the heart's action.

3. That if there are adhesions they are usually absent from the region of the diaphragm.

Larrey says that he has repeatedly tried this operation on the cadaver, and that it can be done with precision and ease. The idea of it was suggested to him by a case in which a man had accidentally suffered a similar operation. This case was a man aged 22, who with his right hand stabbed himself under the seventh rib in a direction upwards and a little to the left. There was a considerable hæmatoma and hæmo-pericardium. Larrey evacuated the blood serum by enlarging the wound and inserting a catheter which reached the heart, and after some vicissitudes the patient got well. Larrey had several bodies placed in the erect position and stabbed in a similar manner, and found that the knife in every instance entered the pericardium, so the method of operation he describes was evolved, but he does not seem to have had an opportunity of practising it.[7]

Allingham[8] describes what he called "the epigastric operation" for drainage of the pericardium. The details seem to be somewhat similar to those suggested by Larrey. Allingham makes his incision along the lower border of the seventh cartilage and then works through the costo-xyphoid space to the under surface of the diaphragm. The pleura is thus avoided and the peritoneum is in no danger. In some cases he says it is desirable to resect the sternal end of the seventh cartilage.

Trousseau[9] lectured on paracentesis pericardii. He recommends the use of the knife.

"I cut through the successive layers of tissue separating them by means of a grooved director. At last the point of the bistoury having penetrated a little too far some slight red serosity spurted along the blade." "I would make my incision in the fifth, sixth, or seventh space near the sternum. If it were necessary I should not hesitate to remove a cartilage so as to allow the pulp of the finger to reach the pericardium. It is necessary to be assured that there is sufficient distance between the heart and pericardium."

Trousseau relates the instructive case of *Roux*.

"Roux proceeded with extreme caution and made the opening by incision in preference to puncture; the result testified to his sagacity. When he reached the pericardium and introduced his finger into the wound he felt the heart beating and slight friction between it and the pericardium, without, however, detecting the slightest degree of fluctuation. The operation was suspended. At the autopsy there was found phenomenal dilatation (dilatation phénomenale), to use Dr. Vigla's expression, with attenuation of the walls of the heart; there were no valvular lesions and no serosity in the pericardium."

Delorme[10] and Mignon give the following directions for opening the pericardium. They systematised surgical knowledge up to the date of their paper.

1. Make a vertical incision from lower border of seventh cartilage to upper border of the fourth cartilage, 1 cm. external to left border of sternum.

2. Dissect off soft parts from ribs and cartilages for 1 cm. towards middle line and for two fingers' breadth outwards.

3. Disarticulate and resect a piece of fifth and sixth cartilage.

4. Carry the incision through intercostal muscles and perichrondrium down to triangularis sterni.

5. With a director worked parallel to posterior surface of sternum detach insertions of triangularis sterni, then introduce finger and completely detach soft parts from posterior surface of sternum. Then seek the pericardium just above the insertion of the cartilages into the sternum, and separate it with the finger from the cellular tissue which covers it; then, when its opaque surface is clearly exposed and its transverse fibres recognised, continue the separation through the whole extent of the wound. Thus the pleura and the internal mammary vessels are displaced outwards and not seen.

6. Pick up the pericardium with the forceps and incise it.

2. PARACENTESIS OF THE RIGHT AURICLE AND VENTRICLE.

These are, I believe, dangerous and freak operations. No more benefit, it would appear, can be derived from their performance than by a free venesection from the external jugular vein. In cases of overloaded right heart many of us must have witnessed the relief given by the taking of two pints of blood from this vein.[11]

The hollow needle for puncture of the right auricle is introduced in the third right costal space

[6] Clinique Chirurgicale, vol. ii., pp. 303 et seq.

[7] The operation is described in Monod-Vammet's work on Operative Surgery, 2nd edition, 1907, vol. ii., p. 988.

[8] THE LANCET, 1900, i., p. 603.

[9] Vol. iii., edition 1868, New Syd. Soc., pp. 366, 394, and 384.

[10] Revue de Chirurgie, 1895.

[11] Dr. Sloan's case (1894) is of great interest (but in his patient the heart had ceased to beat). "I plunged the needle of an aspirator through the fourth space, half an inch to the left of the sternum. 10 ounces of pure blood flowed rapidly into the bottle. As I was slowly withdrawing the cannula the heart made first a feeble irregular movement, then gave a sudden strenuous jump, and finally, like a pendulum regaining its swing or a runner his stride, it started to beat again in the race for life." She slowly recovered and was restored to health. (Trans. of the Med. Chir. Soc. of Edinburgh, 1894-5.)

close to the sternum. To puncture the right ventricle the needle is introduced in the fourth right intercostal space, 1 inch from the sternum. Suction is necessary in the case of the auricle in consequence of the low pressure in that cavity. Such operations are desperate remedies, but so also, it is only fair to add, is the condition of patients for whom such remedies would be thought of.

3. Operation for Air Embolism of the Heart.

The suggestion has been made that the pulmonary artery should be clamped and that the air should be aspirated out of the two branches of the pulmonary artery on the same principle which led Trendelenburg to operate for obstruction of the pulmonary artery by clot.

When I was in Leipzig before the war Trendelenburg demonstrated his operation, and I have since several times practised it on the cadaver. The second left cartilage and a portion of rib is removed, the internal mammary artery tied, the pleura pushed away, the pericardium opened, and the circulation through the aorta and pulmonary artery arrested. The pulmonary artery is then incised and the clot removed by means of forceps. The aorta and pulmonary artery must not be obstructed for more than one and a half minutes. The operation of incising the pulmonary artery, removing the clots and clamping the opening in the pulmonary artery, can be accomplished in 40 to 45 seconds.[12]

4. Cardiac Stimulation for Arrest of Movement of the Heart.

An epigastric incision is the quickest route to the heart, though several other routes have been recommended. Speed is an essential factor; massage must be commenced without any delay. The heart is held through the diaphragm near the apex by the thumb and finger and the ventricles compressed rhythmically from 30 to 40 times a minute.

Ricketts[13] reported 39 cases. Of these the heart-beat was permanently re-established in 12 (34 per cent.). In one of the successful cases the heart function had ceased for 20 minutes before it was re-established. The ages of the successful cases varied from 22 to 65 years.

Many other methods of cardiac stimulation have been proposed, but none can compare with the above in safety, in rapidity of execution, or in the success which has attended its employment. Crile has combined massage with arterial infusion towards the heart. I witnessed at Cleveland an experiment in which a dog's heart commenced to beat 30 minutes after death. Crile caused blood from another dog to flow down the carotid towards the heart, an anastomosis having been done between the carotids of a living and the dead dog. The dead dog recovered; indeed, in 20 minutes it was running about as if nothing had happened. Crile told me that if a dog was revived after 40 minutes of death its moral character was altered.

5. Cardiolysis.

This operation, designed to free the heart from the rigid chest wall in front, especially when its action is hindered by adhesions, and to relieve an enlarging heart from the compression of a too confined space, is an admirable operation in selected cases. It has been proposed that adhesions between the parietal and visceral layers of the pericardium should be separated surgically (Delorme (1898) and Weill of Lyons (1895)). Also, in 1909, Leriche[14] considered the operation justifiable, but suggested excision of pericardium as better. Neither of these operations has been performed, and the possible utility is not apparent, for if adhesions were separated they would soon form again.

For mediastino-pericarditis, when the heart's action is hindered by adhesions, two, three, or more costal cartilages are removed. The first operations of this kind were done in 1902 by Peterson and Simon at the suggestion of Brauer.[15] Thorburn,[16] of Manchester, discusses the question and gives a table of 15 cases collected from literature. He gives one case done by himself, and refers to two others operated on by Stabb at the instigation of Alexander Morison.[17] Morison refers to a similar operation done for him to make room for an enlarging heart in a case of aortic stenosis. He suggests the same operation for mediastinal tumour, especially when the heart is interfered with.

Thorburn's cases number 18; of these, 6 cases were greatly relieved by the operation and in others the results were encouraging, but the exact details in some were not recorded.

6. Operation for Injury of the Heart Itself: Cardiorrhaphy.

A. *Some general considerations and statistics.*—Bullets or other foreign bodies[18] may lodge in the pericardium. They may be free or fixed to the pericardial wall or external surface of the heart. They may produce signs and symptoms or may remain for years in the pericardium inert and without being the cause of any bodily disturbance. The pericardium and heart have been wounded in various ways and by various missiles. The wound may or may not perforate the heart. Sharp-pointed instruments may or may not carry infection; bullets or metal fragments usually do. The operator may diagnose a wound of the heart, but subsequently a wound only of the pericardium, possibly associated with a superficial wound of the surface of the heart, may be found, or a wound of a coronary artery or of one of the great vessels may be present. In each of these cases blood will occupy the cavity of the pericardium. It must not be forgotten that hæmopericardium may be due to hæmorrhage from a vessel of the pericardium, and there may be no other source of bleeding.

With the filling of the pericardium with blood under pressure a great emergency in surgery arises. The auricles are compressed and signs of venous obstruction appear; there is great dyspnœa and cyanosis. The respiration is laboured and shallow and the pulse small, rapid, and of low tension. It is urgent freely to open the pericardium and to *decompress* the heart.

If the operation is performed at a later stage the pericardial sac will be distended, as in old hæmatomata, with a dark fluid, composed of serum secreted from the pericardial wall, old blood and some fresh blood. Again, as in my case, there may be no excess of fluid in the pericardium, and no appearance of sepsis. When infection has taken place before operation, or follows the removal of a bullet, the sac will contain purulent fluid. In some

[12] Ballance: Resources of Surgery in Certain Emergencies, THE LANCET, 1912, i., 139.

[13] Amer. Med. Assoc., 1906.

[14] Lyon Médicale, 1909.

[15] Centralblatt f. Chir., 1903.

[16] Brit. Med. Jour., 1910, i., 10.

[17] THE LANCET, 1908, ii., 7.

[18] Salamoni (1901) collected 91 cases of foreign bodies in the heart which had entered the heart through the chest walls, chiefly the pericardial region. Of these, 40 recovered and 51 died. Quoted from Matas.

of the war cases the virulence of the infection was a marked feature.

The complication of a wound of the pericardium or of the pericardium and heart with a wound of the pleura, or pleura and lung, is frequent. There will then be besides hæmopericardium also hæmothorax and probably hæmopneumothorax. These complications only clinch the necessity for immediate action on the part of the surgeon. During the war massive hæmothorax has been best treated by widely opening the thorax and removing clots and blood. In hæmopneumothorax the condition of urgency is greater in consequence of the danger ensuing from displacement of the heart. The collapse of the lung is an important factor in the control of hæmorrhage from a lung wound. Any way, whether the bleeding threatening life is external or internal, the surgeon's first duty is to stop it.

The heart.—Sudden death from heart failure occurs from many causes, and among these are perforating and non-perforating wounds. Injury to the muscular bundle of His causes rapid death. A wound of an auricle is said by some to be more fatal than a wound of a ventricle, as the walls are thinner and have less tendency to close. A wound of the right ventricle bleeds more or less continuously, while a wound of the left ventricle may bleed intermittently. In my case the bullet nearly passed through the wall of the right ventricle, but its base was fixed in the inner part of the wall, so that there was probably no bleeding into the pericardium from the cavity of the ventricle. An aneurysm may form at the site of a cardiac wound as in any other part of the arterial system from the giving way of the scar tissue. At a later stage the sac may rupture and sudden hæmopericardium will result.

The following tables give the statistical results of Fischer, Borchardt, Rehn, Vaughan, Peck, and Pool.

Georg Fischer[19]*: Statistical Results before Operative Interference was Attempted.*

Punctured wounds	44	Gunshot wounds	72
Incised wounds	260	Crush of chest	76
Total	452 cases.		
Right ventricle	123	Interventricular septum	7
Left ,,	101	Entire heart	16
Both ventricles	26	Right side of heart	4
Right auricle	28	Left ,, ,,	5
Left ,,	13	Coronary artery	2
Apex	16	Unspecified	57
Base	3	Pericardium	51
Total	452 cases.		

In 47 cases foreign bodies were found in the heart: Needles, 18; bullets and shot, 13; various, 16.

Of the 452 cases—

Recoveries.		*Deaths.*	
Heart wounds	50	Within a few minutes	104
Pericardial wounds	22	Later	219
		Time not stated	57
Total	72	Total of deaths	380

In the pre-operative period 85 per cent. died and 15 per cent. recovered. The 15 per cent. include needle puncture, from which the mortality is not great.

In Borchart's[20] list of 78 cases of operation there were 39 deaths, 21 of which were due to sepsis.

In Rehn's[21] list of 124 sutured cases the left ventricle was wounded in 55, the right ventricle in 50, the left auricle in 3, and the right auricle in 4; 15 of the cases were gunshot wounds, and of these 6 recovered. Suture of the left ventricle, according to Rehn, is more successful than suture of the right ventricle. This list of 124 cases shows 40 per cent. of recoveries. The great majority of the fatal cases were due to hæmorrhage or sepsis.

Vaughan[22] gives a list of 150 cases of suture of the heart of man. Of these 98 died, 44 died after the first 20 hours, mostly of infection. Of 133 patients in whom the situation of the external wound is known 130 were on the left side, including 52 through the fourth space and 36 through the fifth space.

Of 140 cases in which the weapon was indicated 16 were caused by bullets; 7 recovered, or a mortality of 56 per cent. Of 142 patients—

The left ventricle was wounded in		68 cases.	
,, right ,,	,,	,,	68 ,,
,, left auricle	,,	,,	4 ,,
,, right ,,	,,	,,	4 ,,

2 had each 2 cavities wounded, 1 both ventricles, and 1 right auricle and right ventricle.

From an examination of the statistical results Vaughan says: "The lesson taught is to do away with drainage."

Peck[23] reports a case of wound and suture of the right auricle. The patient was a girl of 24 and recovered. In this case the heart tamponade had been extreme. The pulse returned immediately the incision in the pericardium was made and 300 c.cm. of dark blood escaped. The tension in the pericardium was great and the blood escaped in a gush. He says that of the 11 reported cases of auricle wounds operated upon, 7 have recovered, a mortality of 36·3 per cent., while the general mortality is about 64 per cent. The consequences of hæmopericardium is to render diastole difficult and aspiration insufficient, whence a progressive and dangerous weakening of the blood pressure.

Peck, combining the statistics of Lenormant, Rehn, and Vaughan, gives 161 cases of suture of heart.

Wounds of right ventricle		69 with	48 deaths.
,, left ,,		74 ,,	45 ,,
,, ,,	auricle	5 ,,	2 ,,
,, right ,,		6 ,,	2 ,,
Multiple wounds		7 ,,	5 ,,
Total		161	102

Thus more than a third of all the cases recovered.

Pool[24] says the immediate results of non-operative treatment are very poor as compared with those obtained by operation. Moreover, although some heart wounds heal without surgical intervention, there is always danger of secondary hæmorrhage from an unsutured wound, and the spontaneously healed heart wound, even a non-perforating one, leaves a weak scar which may rupture or become the site of aneurysm. Loison, as early as 1899, collected nine such cases.

Pool gives a table of 77 cases of heart suture reported in 1909, 1910, and 1911, including earlier cases not previously reported; these supplement the tables published by Peck in 1909, and bring the total up to 236.

The transpleural exposure with long intercostal incision is recommended especially because in a large proportion of heart wounds the pleura is already opened. An extrapleural operation is possible in exceptional cases. Fine vaselined silk on a

[19] Langenbeck's Archiv, vol. ix., 1886, p. 608.
[20] Sammlung Klinische Vorträge neue Folge Chirurg., No. 113–114, 1906.
[21] German Surgical Society, 1907.
[22] Journal of the American Medical Association, vol. lii., February, 1909.
[23] Annals of Surgery, vol. l., p. 100.
[24] Annals of Surgery, vol. lv., 1912, p. 485.

curved intestinal needle is the best material for heart suture. The pericardium should be closed with sutures. Pleural drainage as a prophylactic step is unnecessary and harmful. It is noteworthy that in Pool's case, as in mine, large quantities of clear fluid escaped at the first dressing.

Pool's paper was published in 1912. Between that date and the Great War (August, 1914) there were more than 75 operations on the heart. The mortality of these operations has been slowly decreasing since 1896. I think that the death-rate before the war may be put at about 45 per cent. Adding the cases during the Great War, which number over 60, we have a certain total of at least 380 operations on the heart. Since the performance of Farina's operation I have no doubt, however, that there have been many more than 400 operations on the heart to the present date. Many cases, especially the fatal ones, have not yet been published. Of 58 war cases of which I have notes 44 recovered and 14 died—a wonderful record! The French surgeons seem to have been very successful in these heart operations.

Hartmann's case:

Soldier, wounded at Bapaume, August 27th, 1914, and taken prisoner by the Germans. Very slight symptoms at first. In February, 1915, pain, palpitation, and dyspnœa. In August much worse; frequent heart attacks with sensation of impending death. X ray examination showed bullet in heart. Sent to Switzerland, where he stayed till February, 1917. After being in various hospitals he reached Paris, April 7th, 1917. Operation: Excision of 10 cm. of fifth cartilage and rib from sternal junction. Pleura opened. Projectile could be felt through pericardium; 6 cm. of fourth cartilage and rib excised to give more room. Heart's apex adherent to diaphragm by a band as thick as the index finger. When this was cut through heart could be lifted up. Then incision and extraction of ball from wall of right ventricle. Suture without drainage. Recovery.

Jenckel's case:

The bullet was embedded in the posterior wall of the right ventricle. Operation was done six months after the injury, but had to be abandoned because the heart could not be brought forward enough to expose the posterior surface of the ventricle; the patient recovered. After waiting six months Jenckel operated again, and this time succeeded in removing the bullet, and the man made a good recovery.

Beaussenat's case:

Soldier wounded at St. Hubert, Oct. 1st, 1914. Operation Sept. 17th, 1915. Bullet in right ventricle. Recovery.

During the war there have been several cases in which a bullet has been expelled from the ventricle of the heart. In 1916 Deneke removed successfully a bullet impacted in the right axillary artery. It came as an embolus from the left ventricle. It had been seen in the ventricle and afterwards was located again by the X rays in the axillary artery. In another case the bullet was lodged in the right subclavian artery and was removed through an incision made in the vessel, but the soldier died of sepsis and hæmorrhage; arteriorrhaphy was performed after removal of the bullet.

B. *The operation.*—There are three types of operation which are suitable in these cases. Much depends upon whether the external wound has to be enlarged or not, and whether the pleura and lung have been injured.

1. *The Delorme-Mignon-Kocher Operation.*

When the surgeon can ignore the external wound he will be likely to choose the Delorme-Mignon-Kocher incision over the pericardial region. A square flap of the soft parts is reflected outwards, the fourth, fifth, and sixth cartilages are removed, the internal mammary artery ligated, the triangularis sterni dissected away, and the edge of the pleura and lung retracted by gauze. The pericardium is then exposed, and should be divided so as to get as large an opening as possible.

I dislike the chondro-plastic flap of Kocher; such an operation in the desperate circumstances of a heart wound appears to be out of place. What does it matter that there is a gap in the chest wall afterwards if the patient recover? Further, a chondro-plastic flap means that a dead space is left at the close of the operation under the flap which might determine the onset of sepsis.

2. *The Spangaro Operation.*

Spangaro makes a long incision in the fourth interspace and then divides or disarticulates the fourth and fifth costal cartilages at their union with the sternum, and in some cases also the sternal ends of the third and sixth cartilages may be divided. The fourth and fifth ribs are then forcibly drawn apart by a rib spreader and a fine view of the pericardium, pleura, and lung obtained. Not only by this method can the pericardium and heart be thoroughly explored, but the pleura and lung come under observation too, and the injuries of all are exposed in such a way as to make thorough surgical treatment easy and simple. The fifth intercostal space may be chosen if the surgeon prefers, and he will certainly do so if the wound is in this space. In a large proportion of heart wounds the pleura is opened, and in these the Spangaro operation is to be preferred. When the Spangaro operation is chosen the boundary of the pericardium on the left side back to the posterior surface can be brought fully into view. This allows, therefore, of an incision being made in the pericardium which will effectually drain the cul-de-sac of Haller.[25]

3. *The Duval Operation.*

Some of the French surgeons expose the heart by a *median thoraco-laparotomy* (P. Duval). A paramedian incision is made from the level of the third cartilage to a point midway between the xyphoid and the umbilicus. The abdominal cavity is opened and the diaphragm incised. The sternum is cut through below the third cartilage and split longitudinally for the rest of its length. The halves of the divided sternum are then forcibly separated and a wide exposure of the pericardium results. Some of the French successes during the war have been obtained by this method.

To sum up, the cardinal point to bear in mind is that the organs that have been wounded must be widely exposed. It does not matter what type of operation is chosen by the surgeon as long as this fundamental principle is not departed from.

4. *The Wound of the Heart.*

The wound of the heart may or may not be bleeding. If there is no serious bleeding the blood and clots can most readily be removed from the pericardium by pouring into the sac sterilised warm salt solution. The traumatism of sponging should be avoided. The cavity can be afterwards dried with gauze. The anterior surface of the heart is next inspected, and if no injury is visible a suture should be passed through the apex. The apex is then drawn forwards, so that

[25] Poirier and Charpy's Traité d'Anatomie Humaine, 1912, T. II., F. II., p. 163. Known by English anatomists as the oblique sinus.

the posterior surface of the heart can be inspected and palpated. This displacement of the heart does not disturb its action in any way. "The heart is not the delicate organ it was once supposed to be, it has an enormous capacity to withstand mechanical insult."[26]

When the wound is found, interrupted sutures should be applied in the usual way. The case is otherwise when blood is rushing from the heart and no view of the wound is visible. Matas describes these circumstances as "imposing," and no doubt they are, but chiefly so because of one's want of experience. The surgeon having this job in hand will take it all in the day's work, and just as he plunges his hand into the abdomen into a mass of blood in a case of ruptured spleen, or in a case of ruptured tubal gestation and seizes the bleeding spot, so he will now plunge his hand into the pericardium and seize the heart, and, by digital compression, control the hæmorrhage, and proceed to suture the wound. I once in a case of ruptured innominate aneurysm blocked the lumen of the vessel with my finger till it was possible to pass a ligature around it just above the arch of the aorta, and I imagine the procedure in hæmorrhage from the heart would be of the same character.

When the cardiorrhaphy has been completed the pericardium is to be sutured. If drainage is desired indiarubber tissue should be used. Gauze acts like a cork, and there are obvious disadvantages and dangers in the use of a rubber tube. When there is profuse suppuration the edges of the opening in the pericardium should be stitched to the skin.

5. *The Removal of a Foreign Body from the Heart.*

Supposing the foreign body has been found to lie in one of the ventricles, a fixation stitch is passed through the apex; the heart is held in the left hand and the line of incision for the extraction determined on. A few Lembert sutures are now applied along the proposed line of incision, so that they may be drawn tight as soon as the foreign body is removed. The loops of these ligatures are pulled out of the way, the incision made, forceps introduced, and the bullet extracted. It is just as the bullet comes out that a rush of blood will be likely to escape from the heart, but this can be limited by the pressure of the thumb of the left hand on the ventricle just above the line of incision. The pulling of the Lembert sutures tight immediately arrests the bleeding. It is only when the blood escapes that the blood pressure falls; during all the rest of the manipulation the heart does not appear to be incommoded at all.

The story of the wanderings of foreign bodies and bullets in the vascular system of man is very remarkable. A bullet may perforate the heart or aorta without causing fatal hæmorrhage. The hepatic vein or vena cava may be traversed so that lodgment will take place in the right ventricle, or a pulmonary vein may be perforated so that the bullet is carried into the left ventricle. A bullet may wander along the great arteries till its progress is arrested by the diminished size of the artery. Further, the bullet may be ejected from the right ventricle into the pulmonary artery, or from the left ventricle into the aorta. A round bullet may remain loose in the ventricle and be whirled about by the blood current. All those events have been graphically described by Sir John Bland-Sutton,[27] and Dr. A. Fullerton[28] described a case in which a bullet was ejected from the right ventricle into the upper main branch of the right pulmonary artery.

Radiography is of immense value in accurately locating metal fragments in the heart and elsewhere in the chest, but in certain very urgent cases the operation must be commenced in consequence of hæmorrhage or pressure of the blood in the pericardium before radiography can be used. When this happens and circumstances permit, the fluorescent screen should be employed to assist the operator during the course of the operation in the location of a bullet.

6. *The Wound of the Pleura and Lung.*

All blood must be removed from the pleura. The lung will be collapsed and there will probably be no bleeding. If there is a serious lung wound a few stitches may be desirable, but the wound should first be explored for the presence of a foreign body; such might be found and removed either in the pleura or the lung. I did not experience any case during the war of secondary hæmorrhage from the lung in cases of hæmothorax and hæmopneumothorax after the clearing away of clots and blood from the pleural cavity; so this supposed danger need not be considered. At the close of the operation the opening in the pleura should be closed. It is seldom necessary to aspirate the air from the pleural cavity; it is well to leave a wounded lung at rest for some days. Drainage of the pleural sac is generally advised, because the bullet or dagger is likely to have introduced infection into the wound; but this is a matter for the individual surgeon to decide at the time. The modern method of maintaining the expansion of the lung during operation might be of service in some cases, when the lung is not bleeding and where the urgency is not too great for the requisite preparations to be made.

The following case recorded by Launay[29] of recovery after suture of two revolver bullet wounds of heart is a good example of the value of the operation of suture of the heart.

Man, aged 26. Suicidal revolver wound. There were hæmopneumothorax, hæmopericardium. A wound both on the front and the back of the left ventricle was sutured by Launay. Both pericardium and pleura were drained. Recovery followed without serious complication. The bullet was retained; X ray examination showed it was lodged in front of the vertebræ.

Observations of Rehn and Zesas respecting Operations on the Heart and Pericardium.

Rehn[30] says:—

Needles should be at once removed, larger objects, such as broken pieces of knives, daggers, &c., not until the heart is freely exposed, or at least not until all preparations are made to operate forthwith. In apparently moribund cases the heart sometimes begins to beat again directly the pericardium is incised; so that an operation begun without anæsthesia has to be continued under an anæsthetic. All cases of injury with symptoms of heart compression require at least incision of the pericardium. We cannot know whether it is a perforating wound of heart or a wound of the coronary artery. We only know that it is our duty to operate. No single method of operation is applicable to all cases. Preservation of a bony covering to the heart is the least important matter. In every case it is better to resect several ribs than to make a large flap of bone, cartilage, and soft parts. The pleura seldom escapes injury in wounds of the heart. It is not always possible to operate extrapleurally. Commence by intercostal incision in situation of wound; if there is no

[26] Wabasse: Surgical Treatment, vol. ii., p. 427, 1918.
[27] THE LANCET, 1919, i., 773. [28] THE LANCET, 1919, i., 913.
[29] Gaz. des Hôpitaux, vol. lxxv. (1902), No. 96, p. 926.
[30] Archiv für Klin. Chirurgie, vol. lxxxiii.

wound operate in the fifth space. If hæmothorax or pneumothorax is already present go straight through into pleura, seize lung and displace it outwards. If not enough room make a second incision in middle line, detach cartilages from sternum, and retract ribs and soft parts upwards and downwards.

Zesas[31] expresses the opinion that removal of foreign bodies in the heart is always indicated. In 118 cases 96 were through the chest wall, 12 came from the alimentary canal, 4 by way of blood stream, and 1 from the air-passages. There were needles in the heart in 54 cases, bullets in 38. Besides these, nails, thorns, iron pegs, splinters, and hairpins have been found. Hoch found a nail embedded in the heart of a man who died of unrelated disease. In Manteuffel's case, after the wound of entrance was sewn up on the anterior surface of the right ventricle, the bullet was removed by an incision of the posterior surface. The patient was a woman aged 21 and made a good recovery.

(To be concluded.)

EXPERIENCES OF MALARIA IN THE EGYPTIAN EXPEDITIONARY FORCE.

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THE following summarised account of malaria in the E.E.F. deals mainly with epidemiological points of interest, the mechanism for microscopic diagnosis on a large scale under active service conditions, and the gross pathology of the pernicious cases, in so far as it has a bearing upon treatment. These observations have been made whilst serving with the Force during the last three and a half years. I divide my observations into two portions, the first of which concerns Egypt and the Canal Zone, the second Palestine.

The malarial fevers in both these regions are caused by two species of parasites—the benign tertian and the malignant or subtertian. The quartan, on the other hand, would appear to be almost non-existent in Egypt and to occur but rarely in Palestine.

Malaria in Egypt.

During the summer of 1916 but few cases of malaria were seen; those from the Delta were all of the benign variety, but one fatal unrecognised malignant case from Ismailia came under my notice.

1. *The Canal Zone.*—In August and September, 1916, I was investigating malaria in the southern sector of the Canal Zone, and collected notes of 100 cases among British troops, all fresh infections contracted in that zone of operations.

The special points to note were:—

(*a*) No fresh infections were recorded before the first week in June.

(*b*) Malignant malaria did not commence till August and reached its maximum in September.

(*c*) The difficulty in recognising malignant malaria from a clinical point of view. There were three fatal cases, all of which had been primarily diagnosed as sunstroke.

(*d*) The scantiness of the malignant parasites in the peripheral blood in the early stage of the disease and their tendency to cling to the edge of the red cell (accolée forms); this renders their detection more difficult.

(*e*) The relative scarcity of anopheles. The most abundant species were *Cellia pharoensis*, *A. turkhudi*, *A. mauritianus*.[1] The former two species bred in the borrow-pits in the vicinity of the Sweet Water Canal and in the "seepage" water derived from the subsidiary channels, but, owing to the large numbers of surface-feeding fish, not in the canal itself. The latter bred in highly saline water in the vicinity of the Bitter Lakes. *Cellia pharoensis* is a well-recognised carrier of the benign parasite, while *A. mauritianus* has never been proved capable of acting as an intermediary. Experiments on actual transmission of the malignant parasite demonstrated the suitability of *A. turkhudi* to act as an intermediary, while *Cellia pharoensis* was proved to be but a vicarious transmitter of this disease.[2]

(*f*) Carriers of the malignant parasite were proved to exist amongst the wandering Bedouins, as well as the Indian troops and employés of the Suez Canal Company.

2. *The Fayoum* (Senussi campaign).—A number of cases of malaria occurred amongst the cavalry stationed in this western oasis in November, 1916. The existence of two malignant cases was established by a microscopical examination; the great majority were benign. The most abundant species of anopheles was *Cellia pharoensis*.

3. *The Western Oases* (Dahkla) (Senussi campaign).—The Dahkla Oasis, a notoriously malarial spot, was occupied by the mounted troops in December, 1916. In January, 1917, a number of subacute cases of malaria occurred amongst the troops ten days after their arrival in the oasis. Special points to note were:—

(*a*) The fact that malignant malaria could be transmitted during the winter season when the surface temperature of the sand at night-time was as low as 1° C.

(*b*) The mild nature of the cases and the scantiness of the parasites in the peripheral circulation; often rings were not found till the third day of the pyrexia. Many cases were not diagnosed by the presence of parasites at all, but by the rapid increase in the large mononuclear cells, which rose as high as 35 per cent. Absence of a palpable spleen in these early cases was also noted.

(*c*) The high rate of infection amongst the native population. The splenic index of the children under 14 was 96·4 per cent.; the parasite rate was 59 per cent., all parasites being of the malignant variety.

(*d*) The mosquito intermediary was *A. palestinensis*[3] (differentiated from *A. turkhudi* by the white tips to palpi). Large numbers of these insects were breeding in the warm springs (temperature 80° F.) which water this oasis throughout the winter.

(*e*) The liability of clinicians, in the absence of a microscopic diagnosis, to mistake mild relapsing cases of this nature for relapsing fever or enteric.

Malaria in Palestine.

During their progress across the Sinai Desert no indigenous malaria occurred amongst the troops. After occupying the line of the Wady Guzze a few cases of locally contracted benign malaria were

[31] Fortschritte der Medizin, Band xxviii., No. 21, S. 649, 1910

[1] In the desert on the eastern side of the Canal, where wells occur, as at Ayun Musa, the former two species were found breeding abundantly in the clear well water.

[2] Journal of the R.A.M.C., June, 1918, p. 606.

[3] According to Storey (Entomological Department, Cairo) it is possible that this species is merely a variety of *A. turkhudi*, while the Palestine form, or the true *palestinensis*, is distinct.

FIG. 1.—Type of malaria diagnosis station with equipment. One officer, two orderlies stationed in Jordan Valley. (July, 1918.)

FIG. 2.—The Wady Quelt, Jordan Valley, showing canalisation of the stream, an effective anti-malarial measure.

FIG. 3.—The lower reaches of the Wady Quelt in the Jordan Valley showing formation of typical mosquito-breeding pools.

FIG. 4.—The Kharga Oasis, a highly malarious locality with numerous warm mosquito-breeding pools. (January, 1917.)

Figs. 1, 2, 3, by kind permission of the Wellcome Bureau of Scientific Research. Fig. 4, by kind permission of Colonel J. M. McKenzie, O.B.E., R.A.M.C.

noted in August, 1917, but owing to the vigorous antimalarial measures taken they never reached any large numbers. In September a few malignant cases occurred with one death from coma. Once again the fact was impressed upon my mind that the nature of the illness had not been recognised till too late. Five cases with dysenteric symptoms due to malarial enteritis were seen, accentuating the necessity of distinguishing this complication from the more usual forms of dysentery.

1. *Experiences in 1917.*—Immediately after the successful military operations at Gaza in November, 1917, it became evident that the main body of the E.E.F. had moved forward into a highly malarial zone. From the available medical literature procurable dealing with this matter (Masterman, Huertemueller, Mühlens) it was ascertained that malaria, especially of the malignant variety, occurred along the whole zone from Jaffa to Jericho, and was apt to assume epidemic form during the autumn months, especially mid-October. In November and the early part of December a number of unrecognised and often fatal cases of malignant malaria occurred, and in the middle of December I performed six autopsies on cases with varying original diagnoses, such as debility and influenza. Such a large number of febrile cases occurred, all from two infantry brigades which were then holding the Auja line and which proved to be malignant malaria, as to warrant the suspicion that the infection had been locally acquired during the winter months. This was confirmed by subsequent work at Jaffa during January, 1918, and three more fatal cases occurred.

The main points noted in this connexion were:—

(*a*) The anopheles infected during the previous autumn appeared to be capable of conveying the infection during the winter to troops quartered in

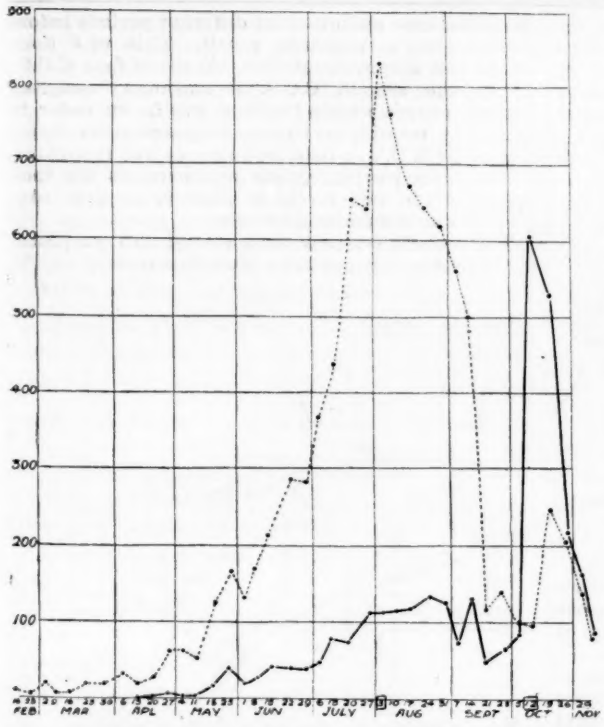


FIG. 5.—*Weekly Malaria Graph of the E.E.F. in Palestine, Western Sector of the Front (Jaffa to Ludd, 1918).*—This graph shows the epidemic of benign tertian malaria, beginning in June and reaching its maximum on August 3rd, 1918 (850 cases per week). *Anopheles maculipennis*, probably the intermediary host, appeared for the first time in large numbers on June 2nd, and extensive anti-malarial operations (draining of the marshes) were completed July 15th. The effect of these measures is well shown by the great fall which took place early in September. The epidemic of malignant tertian malaria follows later and coincides with the advance into enemy territory—i.e., the Plain of Esdraelon—which, being in Turkish hands, was unsanitated in the malarial sense. The maximum of this epidemic was reached on Oct. 12th (600 cases per week). These figures deal with fresh infections and not relapses.

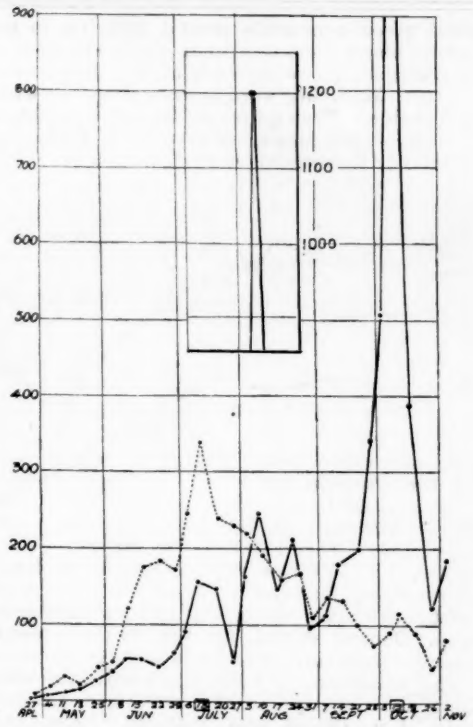


FIG. 6.—*Weekly Malaria Graph, Eastern Sector of the Front (Jerusalem to Jordan Valley).*—This graph shows a small preliminary epidemic of benign tertian malaria, reaching its maximum nearly a month earlier than on the Western side—i.e., July 13th. There is a tendency for malignant tertian malaria to predominate in the latter part of July and August, but, owing to the anti-malarial measures taken, it never assumed epidemic form. The great epidemic took place when the desert corps moved forward on the east side of the Jordan to Amman, and reached its maximum on Oct. 12th, after the occupation of Damascus (1200 cases per week). *Anopheles palestinensis* was the mosquito host and first appeared in large numbers about the middle of June and reached its maximum prevalence in October. These figures also deal with fresh infections. The occupation of Damascus was effected on Oct. 2nd, exactly ten days after the concentration at Beisan, where the actual infection was contracted. This period would appear to be the incubation period of malignant malaria.

These graphs have been constructed from 111,261 microscopic blood examinations performed by different military laboratories on this front within six months, of these 40,168 were undertaken by the six malaria diagnosis stations in the front line. The important dates are emphasised in brackets in the graph. The total force, British and Indian, employed comprised about 300,000 men. The dotted lines indicate benign, the continuous malignant malaria.

native houses. The cases mostly came from two infantry brigades who successfully held the same portion of the line (Auja River) and occupied the same billets.

(*b*) Female anopheles (*A. bifurcatus*) were proved to be capable of laying ova during the winter season, and these ova were capable of hatching out and producing active larvæ in sheltered places, as in deep wells.

(*c*) The serious nature of the malignant infections. Three sudden deaths occurred a few hours after admission to hospital; autopsies were performed and large numbers of parasites demonstrated in the tissues. The alarming nature of these fulminating cases can hardly be realised. One man was found dead on the march after a halt, while two others died three hours after admission to hospital.

(*d*) The pleomorphic clinical forms which malignant infections could assume.

2. *Experiences in 1918.*—It became very probable that front line units would have to pass the greater part of the summer months in a highly malarial region, of which undoubtedly the worst areas were the Maritime Plain to the north of Jaffa and the tropical belt of the Jordan Valley.

It was realised that, though the incidence of the disease and the occurrence of pernicious and fatal forms could be minimised much by sanitary measures whilst the troops were stationary, yet the task was one of great magnitude, and the occurrence of a considerable number of cases could hardly be prevented in such a highly infected country; furthermore, that directly an advance was made further to the north sanitary precautions would become unavailing. The German statistics compiled in 1912 indicated that an epidemic of malignant malaria occurred in the autumn months, about mid-October (similar graphs have been recorded by Armand-Delille from Salonika).

Formation of malaria diagnosis units.—Realising that the safest plan in dealing with malignant malaria on a large scale consisted in early microscopic diagnosis, special mobile diagnosis units were formed, so as to ensure early diagnosis and early treatment. Six of these units, called malaria diagnosis stations, were formed, consisting each of one medical officer and two R.A.M.C. privates, who

were given a month's special training in microscopic blood diagnosis and, when efficient, were distributed two to each corps. By the end of April, 1918, they were at work along the whole of the line. The equipment was of a portable and very simple character capable of being loaded on one G.S. wagon with four horses. The best form of portable tent for the purpose was found to be the I.P.G.S., 160 lb. The essentials provided were:—Tables, G.S., 3; forms, G.S., 3; lamps, hurricane, 3; microscopes, 2; and a supply of standardised Leishman's stain slides, distilled water, and spirit lamp. Central depôts for the further supply of reagents were formed at Ludd and Jerusalem.

The standardised Leishman's stain for issue to these units was prepared as follows:—Leishman's stain, 1 g. (Baird and Tatlock); Abs. methyl alcohol 200 c.cm.

The Leishman powder (1 g.) is placed in a glass mortar, 20 c.cm. of methyl alcohol are added, and the powder is ground down with a pestle until the alcohol is saturated. The fluid is now decanted off into a clean bottle and a further 20 c.cm. of methyl alcohol added to the residue in the mortar, which is again ground with the pestle until as much as possible is dissolved. The process is repeated, using successive fractions of methyl alcohol, until the whole of the powder is in solution. The volume is made up to 200 c.cm. finally with methyl alcohol, and 12 drops of a 1 per cent. NaOH solution are added and well shaken.

The method of staining adopted is as follows: The best portion of the blood smear is selected and marked off with a grease pencil. (The grease pencil marks confine the stain to that particular area of the slide, and when dealing with hundreds of films this practice effects a considerable saving of stain.) Raw Leishman's stain is dropped on to the slide by means of a pipette provided with a rubber teat; this is left for about 30 sec., the stain on the slide is now diluted with distilled water about 1 in 4 and left for a further 2–3 min. At the end of that time the stain is washed off with distilled water and the slides are arranged in a sloping position to drain and dry. The teat pipette was used throughout the process, both for adding the stain, for diluting the latter with distilled water on the slide, and for finally washing off. This method made for far greater economy of materials and cleanliness than would have been the case if a "drop-bottle" had been used.

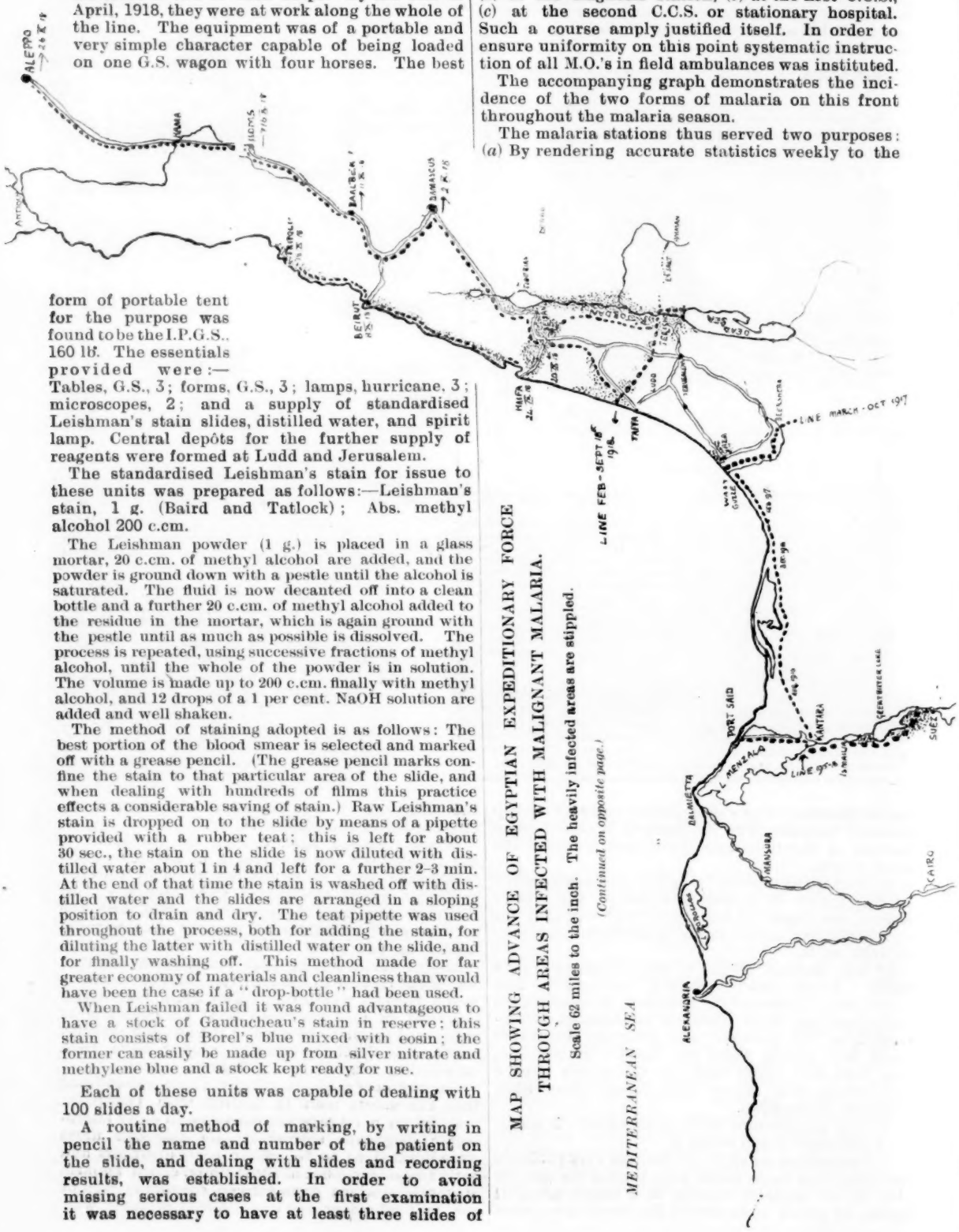
When Leishman failed it was found advantageous to have a stock of Gaudu cheau's stain in reserve; this stain consists of Borel's blue mixed with eosin; the former can easily be made up from silver nitrate and methylene blue and a stock kept ready for use.

Each of these units was capable of dealing with 100 slides a day.

A routine method of marking, by writing in pencil the name and number of the patient on the slide, and dealing with slides and recording results, was established. In order to avoid missing serious cases at the first examination it was necessary to have at least three slides of the same case examined at different periods before pronouncing a negative result. This was done (*a*) at the diagnosis station, (*b*) at the first C.C.S., (*c*) at the second C.C.S. or stationary hospital. Such a course amply justified itself. In order to ensure uniformity on this point systematic instruction of all M.O.'s in field ambulances was instituted.

The accompanying graph demonstrates the incidence of the two forms of malaria on this front throughout the malaria season.

The malaria stations thus served two purposes: (*a*) By rendering accurate statistics weekly to the



MAP SHOWING ADVANCE OF EGYPTIAN EXPEDITIONARY FORCE THROUGH AREAS INFECTED WITH MALIGNANT MALARIA.

Scale 62 miles to the inch. The heavily infected areas are stippled.

(*Continued on opposite page.*)

A.D.M.S.'s of the divisions and to the D.D.M.S. of the corps of the number of fresh infections occurring in different units, the type and *location* of the infection could be ascertained and steps taken accordingly; (*b*) ensuring, by early diagnosis, the *early exhibition of quinine by the intramuscular* route to all serious cases.

Classification of Clinical Symptoms of Malignant Malaria.

The experience gained of malignant malaria and the clinical forms it may assume can be classified as follows:—

I. *Pernicious or Rapidly Fatal Forms.*

(*a*) Cerebral (generally occurring in the summer).

Primary Clinical Diagnosis.	*Corresponding Clinical Variety of Malignant Malaria.*
"Sunstroke;" "heatstroke."	Comatose or delirious type, with hyperpyrexia.
"Mental derangement."	Maniacal type, with tendency to suicide.
"Epilepsy."	Epileptiform type.
"Cerebro-spinal meningitis."	Cerebral type.

(*b*) Abdominal (generally occurring in the winter).

"Dysentery," with blood and mucus.	Dysenteric type.
"Cholera" or "paracholera," with diarrhœic fæces and incontinence.	Choleraic or algide form, with subnormal temperature and collapse.
"Intestinal obstruction."	Condition due to gross infection of intestinal capillaries by malignant parasites.
"Appendicitis" or "cholecystitis."	Various forms of referred abdominal pain in malignant infection.

(*c*) Pulmonary (with pulmonary symptoms).

"Bronchitis"; "pneumonia"; pleurisy.	Malarial pyrexia, with pulmonary congestion and cardiac distress due to myocarditis. Pain over left hypochondrium, due to rapid enlargement of the spleen.

(*d*) Cases with skin lesions.

"Purpura" or "measles."	Septicæmic type of malignant malaria with multiple cutaneous hæmorrhages.

II. *Clinical Types of Average Severity.*

(*a*) Influenzal or myalgic.

"Influenza" or "rheumatism."	Pyrexia with joint pains.

(*b*) Enteric with steppage rise of temperature.

"Enteric," "sand-fly fever," "trench fever," "relapsing fever."	Splenomegaly with pyrexia.

(*c*) Icteric with bilious vomit.

"Jaundice" or "infective jaundice."	Bilious remittent form, with vomit of bile or "coffee grounds," remittent pyrexia, and hæmolytic icterus.

(*d*) Nephritic.

"Acute nephritis."	Albumin, blood, and pus cells in urine.

III. *Sequelæ.*

(*a*) Cachexia and anæmia.

"Pernicious anæmia," "leucocythæmia," "debility."	Enlarged spleen and great anæmia due to blood destruction.

(*b*) Blackwater fever (methæmoglobinuria).

"Hæmaturia."	Methæmoglobinuria and pyrexia.

In accounting for the comparatively high proportion of pernicious forms of malignant malaria in Palestine the probability of different *strains* of the parasite in different countries and their effect upon the human body must not be lost sight of. A similar analogy exists in the case of trypanosomiasis.

At the time of the advance on Sept. 19th/20th, 1918, the number of malignant tertian cases diagnosed by laboratories and diagnosis stations was, on a weekly average, 60 on the line Jaffa-Ludd and over 200 on that part of the line extending from Jerusalem to Jericho. At the beginning of October a very marked increase in the number of cases was noted, which reached its maximum in the week ending Oct 12th, when 1800 fresh infections were recorded. At the same time the clinical type of the disease was a very severe one, and there were many fatal cases. The diagnosis stations attached to the cavalry divisions were able to accompany them to Damascus. Their presence there was very necessary. A large number of serious cases developed soon after the occupation of that town and there was a tendency for medical officers to diagnose them on clinical grounds, especially from the associated diarrhœic symptoms, as dysentery. The majority of these infections appear to have been contracted in the plain of Esdraelon, and especially during the concentration around Beisan. The advance from this latter place to Damascus occupied 10 days—the incubation period of malignant malaria. The Anzac division operating on the right of the Jordan towards Es Salt and Amman also suffered heavily.

The situation was, moreover, complicated by the presence of the influenza epidemic, thus rendering a diagnosis of malignant malaria, without microscopic aid, almost an impossibility.

The Chief Points Summarised.

The following summary of the chief points in connexion with malaria in Palestine in the summer of 1918 may be given.

1. On the seaboard and the plain of Sharon the benign variety predominate, while east of Jerusalem the converse was the case, with a tendency for the malignant disease to assume epidemic form in the autumn months, especially mid-October. (M.T. malaria is endemic in the Jordan Valley; the splenic index of native children in Jericho was assessed as 65 per cent. and the parasite rate 54 per cent., mostly of the malignant type.)

2. The main mosquito intermediary in the benign tertian zone appears to be *A. maculipennis* and in Jordan Valley *A. palestinensis* (other anopheles found were *A. superpictus* (or *A. sinensis*), *A. fragilis* *A. bifurcatus*, and *A. turkhudi*)

3. The incubation period of malignant malaria in epidemic form is one of from 10–14 days.

4. The efficacy of early intramuscular quinine (gr. xii. in 2 c.cm. saline) early in the course of the disease. (A point to note in the distribution of quinine is that ampoules containing sterilised solutions of quinine should be supplied to front line units, while stationary, or general hospitals can more advantageously utilise sterilised solutions of quinine made up in vaccine bottles with rubber caps.)

5. The fatal nature of the infection if undiagnosed and untreated for a period of five days.

6. The most acute cases die of heart failure (apparently a toxæmic myocarditis), and therefore stand rapid evacuation badly.

7. The undesirability of intravenous quinine in acute cases with cardiac involvement: owing to the large numbers of parasites in the peripheral circulation it would appear that injection of large doses of quinine by the intravenous route destroys them with great rapidity, and in so doing floods the body with liberated malaria toxins which completely paralyse the cardiac mechanism.

8. The mechanism for early diagnosis and early treatment broke down on a rapid advance into a highly malarious country, with a consequent great increase in the number of fatal cases and pernicious infections.

9. The malignant tertian infection is much more amenable to quinine treatment than is the benign. This may sound paradoxical, but in the case of the former parasite it is a case of either kill or cure, and it is a remarkable fact that in Jordan Valley malignant infection relapses were not frequent. Very often a primary infection when treated early with quinine appeared to die out entirely. On the other hand, the benign infection, though amenable to quinine for the time being, relapses only too often in spite of it, and is therefore from a military point of view in many ways the greater obstacle of the two.

Bearing of the Pathology upon Treatment of Pernicious Forms of M.T. Malaria.

In the official returns for the whole force from May to end of December, 1918—i.e., eight months—the number of deaths proved to be due to malignant malaria was 853; of these, 75 were recorded during the first five months, and 773 during the last three—that is, subsequent to the advance into Syria.

The following is a summary of 67 consecutive post-mortems on malaria cases performed at Ludd during the period Oct. 1st to Nov. 8th, 1918.

Uncomplicated malignant malaria, 35.

Complicated by influenzal broncho-pneumonia, 32.

Of these *uncomplicated* M.T. malarias: (*a*) died in collapse with right heart failure, 24; (*b*) died with generalised hæmolytic icterus, 8; (*c*) died in coma with œdema of brain and blood-stained fluid in ventricles, 3.

In only four cases could parasites be demonstrated in the tissues, none of which had been adequately treated with quinine. There were four cases of terminal secondary infection with staphylococci, streptococci, and pneumococci. In no case had the diagnosis of malignant malaria previous to death been made without microscopic confirmation. Nor did any case come to autopsy in whom the infection had been missed during life after the adoption of the three-slide rule.

The first point to note is the evidence of a malarial toxæmia as against the hitherto accepted theory of a mechanical obstruction of the capillaries by the malignant parasite. For instance, no such obstruction could be substantiated in cases with cerebral involvement after quinine treatment. The œdema of the brain, the increase in the cerebro-spinal fluid suggest lumbar puncture as a means of alleviating urgent symptoms. (This was adopted by some clinicians with a fair amount of success.) The tendency to mental derangement[4] and suicide in malignant cases must be borne in mind. Heart failure has been mentioned and emphasises the paramount importance of *rest* in all malignant infections. The toxæmic cases with generalised hæmolysis indicate the close relationship between this type and blackwater fever, and consequently their treatment on similar lines.

It was demonstrated that three intramuscular quinine injections of gr. xii. each, on three separate consecutive days, cause not only a complete *temporary* disappearance of the parasite from the blood-stream, but also, after this amount had been absorbed, the size and condition of the spleen rapidly returns to normal. Therefore more frequent injections are not indicated in order to overcome the acute crisis of the disease. On the other hand, intravenous salines (1–2 pints) are indicated as a means of eliminating the toxins, and in cardiac cases in which there is engorgement of the right heart, abstraction of venous blood previous to this injection.

The adoption of this line of treatment was distinctly favourable in the few apparently desperate cases in which it was tried. Two German prisoners, for instance, who had remained comatose for two days in spite of quinine, recovered completely with intravenous saline without any further administration of this drug.

The Effects of Intramuscular Quinine upon the Tissues.

Observations were made at autopsy upon cases injected intramuscularly with quinine (quinine bihydrochloride gr. vi. to saline 1 c.cm.). Within four hours of injection, on incising the gluteus, a considerable serous effusion could be demonstrated in the muscle. Within 24 hours a superficial grey necrosis of muscular fibres was evident, but within the next few days these effects were no longer visible.

The effects of continuous injection at the same site were different; patches of necrotic tissue about the size of an almond, often communicating with other loculi of the same nature, could be demonstrated. Sometimes these cavities were occupied by blood clot, but more often by dead muscular fibres of a dark brown or greenish hue. *There was no evidence of pus formation.* Extensive necroses were most often observed when the injection impinged on the ilium itself. In one fatal case there was a generalised streptococcal infection of the necrotic tissue, probably of hæmic origin, as there was no evidence of any external infection obtainable.

The general indications are that continuously repeated intramuscular quinine injections in debilitated, anæmic, and emaciated subjects are to be avoided, if possible, as being liable to cause extensive necrosis of the muscular tissue. It must be remembered that the blood-forming mechanism of the bone marrow is inhibited by the malarial toxins and renders the body more liable to secondary infections of all kinds.

[4] Three cases which came under observation were so odd in their behaviour that they had been regarded by their regimental officers as men whose minds had become deranged by the stress of battle.

The suggestion is that greater dilution of the quinine for intramuscular injection would be followed by better results, but this is hardly practicable in the routine treatment of so many cases in C.C.S.'s on a large scale.

The moral of all this is that intramuscular quinine judiciously administered has its distinct beneficial usage, but it is open to *abuse*. There is no advantage in making one's patients' buttocks into pincushions, and one should remember that it is worse than useless to continue exhibiting quinine by this route after the parasites have disappeared from the circulation. One must treat one's patient, as well as destroy his parasites. The lesson is that a few injections of quinine are capable of destroying all the parasites in the spleen and of reducing that organ to normal size.

Defects of Scheme for Early Diagnosis and Treatment of Malaria in Palestine in 1918.

The main defects in the scheme I have outlined are that provision for diagnosis was not sufficient to meet the needs of the moment on such an extensive and rapid advance into enemy territory as that of September, 1918. The difficulties of continuous supply of the diagnosis units 200 miles from the base were considerable, nor was it possible for them to examine slides for field ambulances scattered over so wide an area.

Remedies Suggested.

That each field ambulance in an Eastern theatre of war should have on its strength one medical officer specially trained in the microscopic diagnosis of malaria. His equipment need be very simple and consists of a microscope and minimal requirements of slides, stains, &c. Attached to him there should be an orderly specially trained in this microscopic diagnosis, in which it has been proved that an R.A.M.C. private of average intelligence can become expert after a month's continuous training.

That to each corps there should be attached one expert pathologist to supervise the scientific work of these officers. That he should be provided with a Ford box-car fitted up with cases containing spare microscopic parts, Leishman's stain, slides, distilled water, spare hypodermic syringes, syringe needles, and quinine ampoules. He should be so situated as to be able to supply any deficiencies at a moment's notice and, at the same time, to be very mobile.

That a uniform method of recording results and quinine treatment upon field medical cards should be adopted. These should be stamped in indelible ink and different symbols for the designation of malignant or benign infection utilised. When written on in pencil, as is so frequently the case, the *primary diagnosis*, which is so important, is apt to be rubbed off as the patient is evacuated down the line.

It is most important, and I do not think this is sufficiently realised, that a primary microscopic diagnosis once made must be adhered to.

Advisability of Adopting a Standard Method of Differentiation Between the Parasites.

It is suggested that standard rules for the differentiation of the two main forms of parasite be adopted. The main points are that the benign tertian parasite invariably enlarges the red cell which it inhabits. This is a much safer rule than the presence of "Schüffner's dots," which are not invariably present in early infections. On the other hand, the points of importance in connexion with the malignant parasite are: (*a*) Its smaller size; (*b*) no alteration in size of red cell; (*c*) tendency to multiple invasion of same red cell; (*d*) presence of two nodules of chromatin.

It must be remembered that in the very heavy acute infections further developmental forms of the malignant ring may be seen in the peripheral blood, such as immature schizonts and gametes. Even sporulating forms of this parasite were found on two occasions in the peripheral blood—an extremely rare occurrence. These are apt to be confused with the quartan parasite. Possibly this fallacy accounts for the comparatively high proportion, 25 per cent., of quartan[5] infections recorded by German observers in Palestine.

My thanks are due to the D.M.S. E.E.F., Major-General Sir R. Luce, K.C.M.G., C.B., A.M.S., and to the late Lieutenant-Colonel W. Angus, R.A.M.C., for permitting me to make use of information gathered in the course of my duties. I have to acknowledge my gratitude to my A.D.M.S., Lieutenant-Colonel J. J. Abraham, C.B.E., D.S.O., for his sympathy and encouragement in carrying out this scheme. I am indebted also to the officers in charge of military laboratories and diagnosis stations for permitting me to utilise their returns over the period under review; to my orderly, Private T. R. Goddard, R.A.M.C., who loyally assisted me during the last two years of the campaign; especially do I wish to thank my colleague, Captain E. C. Myott, R.A.M.C., for compiling the graphs which illustrate this report from statistics submitted to me weekly in the ordinary routine.

DIVERTICULITIS.

Being the Introductory Remarks to a Discussion at the Section of Surgery (Subsection of Proctology), Royal Society of Medicine, on Jan. 7th, 1920,

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THE subject of diverticulitis is one in which the Subsection of Proctology has naturally a very special interest, but of which a full practical knowledge should be possessed by every abdominal, gynæcological, and genito-urinary surgeon, as well as by physicians and morbid anatomists. I will here concern myself with the broad lines of the subject, and mainly in its clinical aspects.

In 1917, when last reviewing the subject, I wrote[1]:—

"Diverticulitis is a condition which has now passed out of the realm of doubt and uncertainty into that of proved and accepted fact. It has an important place in medical literature, and in the experience of every operating surgeon of large practice. This last statement is not as yet true of all clinicians, some of whom are still apparently unaware of the condition, and not a few of its frequency and clinical importance. Not until a morbid condition is described in all the ordinary student's text-books[2] of medicine and surgery can it be said to have attained complete recognition, and this is not yet the case with diverticulitis."

This is practically the situation to-day. Diverticulitis means any inflammatory change in any diverticulum or series of diverticula. In practice,

[5] The quartan parasite was found nine times out of 40,168 blood examinations by malaria diagnosis stations within six months.

[1] Brit. Jour. of Surgery, vol. iv., No. 17. To this article reference may be made for a detailed study with analysis of cases.

[2] A small paragraph first appeared in the 1910 edition of Osler's Medicine.

however, usage has restricted the term to the inflammatory changes and secondary pathologic processes generally occurring in or in connexion with a certain type of diverticulum. This type is the secondary acquired, multiple, false diverticula of the *large* bowel, particularly and nearly always found in the sigmoid flexure. The diverticula occur mainly in the lower part of this structure in small or great numbers, but may be found elsewhere, as in the descending colon, the other flexures, the cæcum, the rectum, or throughout the entire large bowel. They may be limited to these special positions, though are more usually associated with sigmoid lesions as well; if so limited, they may give rise to puzzling and anomalous symptoms. The cæcal cases especially are of considerable interest, and merit much more attention and investigation than they have already received. Occasionally there is a widespread tendency to diverticulum-formation throughout the whole intestine. For convenience, however, I shall confine my remarks to the typical lesion as it occurs in the sigmoid flexure.

"*Stabilisation*" *of the Subject.*

Historically, diverticulitis may fairly be said to be a new subject. Odd specimens had been described from time to time during last century, but such descriptions were "buried" and isolated, and the clinical aspects of the lesion were for all practical purposes unknown. In 1898 Graser[3] described examples associated with fibrous hyperplasia, causing stenosing tumour-formation—*peri-diverticulitis*. Similar cases were then described in America, and Patel[4] in France drew particular attention to the more acute inflammatory lesions—sigmoiditis and peritonitis. I observed my first case in 1899 and finding nothing about it in the literature, or even any one who was familiar with the condition, I thence onwards made it a practice to examine almost every sigmoid flexure personally at the autopsies I made. The result was the accumulation of a considerable amount of material. In 1907, Moynihan[5] published the first case in England of the Graser-tumour type, and this induced me to analyse and classify my cases. This I did in 1908,[6] and this was the first time the subject had been treated as a whole and the various pathological findings and clinical symptoms correlated, or that any complete arrangement and classification had been attempted. That classification has been in essentials accepted by almost all subsequent writers and observers, and writing now, 12 years later, when a very considerable number of cases has been observed and recorded, I have no important modification to offer.

The reason that this early "stabilisation" of the subject was possible is this: Given the occurrence of a tendency to the formation of multiple hernial out-pushings of the mucosa in the sigmoid flexure every secondary process that does in fact occur may be logically deduced a priori, by general pathological comparison and study. I am not proposing to deal with the vexed question of *why* these diverticula occur in the first place except that there is no doubt that they are largely, if not entirely, due to increased pressure from within the bowel. Constipation, therefore, plays an important part, but I feel convinced that flatulent distension, often co-existing, of course, has a rôle that cannot be overlooked and needs more study.

[3] Cent. f. Chir., 1898.
[4] Lyon Chir., 1911, vi.
[5] Edin. Med. Jour., 1907, xxi., p. 228.
[6] THE LANCET, 1908, i., 843.

Anatomy of the Diverticula.

A knowledge of the anatomy of these diverticula is of the first importance in understanding the secondary pathologic processes, and also in detecting them at all, either in the dead-house or at operation. At this point the inquiry is pertinent as to how it comes about that the condition has for so long escaped practical recognition, having regard to the large number of cases recorded—not a tithe of those observed—since 1898. The answer, is, I think, to be found in three facts. Firstly, the majority of demonstrators of morbid anatomy fail to devote special and personal attention to the sigmoid flexure, and perhaps to those surgical autopsies in which the surgeon has "spoiled" the abdomen generally and a specimen in particular by his manipulations; particularly when the structures operated on have been more or less inflamed, adherent, and "mixed-up." Secondly, the diverticula themselves are "adepts" at concealment; this I will return to later. Thirdly, the secondary pathologic processes are liable to be so extensive and disproportionate to the comparatively insignificant diverticula as to hide the true nature of the case from any but patient and skilled observers. This must be the general experience of all who have studied a series of specimens in situ.

The second of these points, the "self-concealment," turns upon the anatomy of the diverticula. Firstly, they are small, varying from minuteness up to the size of the last joint of the little finger; more commonly they are 1/3 to 1/5 this size. Their apertures are often minute, from 1/16 to 1/3 of an inch in diameter, and these apertures usually occur in two rows, mostly opposite the appendices epiploicæ, and often completely concealed by the rugose mucous membrane. On the outside of the gut the diverticula are seldom observed, except by the trained eye, because: (1) they mainly enter the appendices epiploicæ as stated; and (2) the gut in which they occur is very frequently fat-laden, necessitating careful dissection to discover them at all. The occurrence of adhesion to other structures and of peri-diverticular hyperplasia tends still further to conceal and almost to obliterate their presence. Even so, the fact that isolated observations on them for over a century should have failed to lead to complete recognition is a little remarkable, but none the less a fact.

I am stressing these anatomical points rather carefully, as they must be fully appreciated by every operating surgeon if he hopes to recognise the condition at the time of the operation.

Once the diverticula are "in being" the whole series of possible consequences depends upon the following three facts: (1) being formed by pressure from within they tend to enlarge; (2) they tend to harbour fæcal or other harmful contents; and (3) as a consequence they tend to undergo various secondary pathologic processes. In their enlargement they become flask-shaped, with a bottle-neck; this bottle-neck may greatly elongate, its lumen remaining very narrow. This elongation is brought about by *peri-diverticular hyperplasia*, which often pushes the "flask" to its circumference, where it "sits" on the surface of the tumour and works special mischief of other kinds, such as adhesion, perforation, and fistulous communication.

Secondary Processes.

The narrow mouths tend to promote the retention of fæcal contents, soft or forming actual concretions. Here analogy with appendicitis will

largely help us to prophesy results, except in regard to the remarkable hyperplastic peridiverticulitis. The fæcal contents form a bacterial nidus, a reservoir of toxins and a source of mechanical irritation. As a result secondary changes supervene; if not, the condition remains a harmless pathological curiosity and gives rise to no symptoms or trouble. Perhaps the large majority of instances are largely or entirely innocuous.

The main secondary processes which do occur, separately or variously combined, are: (1) Ulceration of the mucosa of the diverticula. (2) Perforation as a consequence. (3) Adhesion to other structures which, when combined with (2), leads to fistulous communication. (4) Peridiverticular fibrous hyperplasia leading to tumour-formation and, as a sequential result, stenosis of the bowel.

Confining our attention to these main and usually secondary processes, which, as has been stated, may be variously combined, a few moments' consideration will show how protean and puzzling the resulting clinical manifestations may be. In the first place, mucosal ulceration will weaken the wall of the sac. This will facilitate perforation, and a concretion will be specially liable to be driven through at any time of increased pressure or violent effort, causing a local or general peritonitis. In quite a number of cases this has actually happened.

The mucosal ulceration also sets up inflammation on the outer surface of the diverticulum leading to adhesions. These *may* produce no important results, but *may* produce vesical or pelvic syndromes or an acute intestinal obstruction by band or kink. Adhesions plus perforation lead either to local abscess with its varied symptoms, signs, and sequential risks and possibilities, or to fistulous communication with other viscera, of which that with the bladder is the commonest, most interesting, and surgically the most important instance.

Peridiverticular Hyperplasia.

The culminating interest is reached, however, in the production of the fourth type of lesion, the peridiverticular hyperplasia. This may exist with mucosal ulcerations of the diverticulum, but not infrequently occurs without it, and is a common and characteristic result, the one which first led to a systematic investigation. It is undoubtedly due to a chronic leakage of toxins or bacteria, or both, through the sac walls, producing a hyperplastic fibrous-tissue formation somewhat similar to that found in hyperplastic tuberculosis of the cæcum, or more closely resembling a scirrhous cancer. Because of the hyperplasia, which may amount to an inch or more in thickness on section, a tumour is produced; because it is fibrous the tumour contracts and stenoses the bowel, tending towards chronic intestinal obstruction. This thickening and stenosis may be so local as to make an annular stricture, and it will be realised how close is the mimicry of carcinoma. In this way, doubtless, many of the cases of so-called "cured" cancer in this region may be explained, as well as the placing on museum shelves examples of peridiverticulitis labelled cancer. Others besides myself have found them.

There is, however, a very special relationship of the condition to true carcinoma. A simple peridiverticular stenosis (or possibly other diverticular lesion) may develop carcinoma secondarily, as in the case of a chronic gastric ulcer. A small number of cases have now been put on record, and since my last records were published in 1917 I have had a further case. The patient was riding and felt a sudden pain in the left iliac fossa, followed by temperature and signs of inflammation. I made a diagnosis of perforative diverticulitis, and Sir Berkeley Moynihan operated and confirmed, finding multiple diverticula, one of which had perforated and set up general peritonitis. There was also some thickening and stenosis, but no naked-eye evidence of malignancy. A year later a second surgical inspection was made, and malignant disease was then obvious and inoperable.

It is not too much to say, therefore, that no surgeon ought to decide about or operate on a supposed carcinoma of the sigmoid flexure without an accurate knowledge of what may be termed "diverticular possibilities," nor ought any such tumour removed by operation to lack a complete and *skilled* examination for the presence of a diverticula. It was only by this means that Moynihan detected and recorded the first of such cases in the English literature.

Groups of Secondary Processes.

We can usefully divide the secondary processes into two such groups: (*a*) mechanical (mainly), and (*b*) inflammatory (mainly). Both processes may go on in the same case, just as there may be present together varying types of inflammatory reaction.

A. *Mechanical.*

1. Formation of fæcal concretions in the diverticula.
2. Torsion of the diverticulum.
3. Lodgment of foreign bodies within the diverticular sacs.
4. Perforation.

B. *Inflammatory.*

1. Diverticulitis: (*a*) Gangrenous; (*b*) acute; (*c*) subacute; (*d*) chronic; (*e*) latent.
2. Passage of organisms without perforation.
3. Peridiverticulitis—chronic proliferative inflammation with tendency to stenosis of the bowel.
4. Perforation of the diverticula, giving rise in particular to: (*a*) General peritonitis; (*b*) local abscess; (*c*) fistula, especially into the bladder; (*d*) suppuration in a hernial sac.
5. The formation of adhesions, especially to: (*a*) The small intestine; (*b*) the bladder; (*c*) the female genitalia.
6. Chronic peritonitis, local.
7. Chronic mesenteritis of the sigmoid loop.
8. Metastatic suppuration.
9. The secondary development of carcinoma.

By the aid of this pathological series it is not difficult to forecast the main clinical symptoms and also to surmise that they will be liable to be variable, complex, and puzzling. This is so in fact, as a study of case records abundantly proves. At the same time, the majority of cases conform more or less to the following types: (1) Inflammatory trouble or tumour in the left lower quadrant of the abdomen; (2) general peritonitis; (3) vesicocolic fistula; (4) pelvic syndromes; (5) intestinal obstruction; (6) mimicry of carcinoma.

The frequency of tumour or abscess formation in association with any or all of these is considerable (about 30 per cent.), and one may say that any case from the age of 30 onwards, presenting these symptoms, calls for a mental reservation as to the possibility of a diverticular origin, and in some instances the diagnosis can and has been made with certainty and accuracy.

As general clinical points it must be remembered that cases occur mostly at or after middle age (though a few cases in early life have been noted)—in males more frequently than females; usually

with a history of constipation and very seldom causing blood in the stools. A few comments are called for on some of the foregoing clinical types of case.

Inflammatory trouble, more or less acute, in the left lower quadrant of the abdomen.—Cases of this type constitute by far the largest group. Erdmann has gone so far as to say that the occurrence of left-sided pain, with mass or not, but with tenderness and rigidity, is practically pathognomonic of diverticulitis. This is the extreme view, favoured by the main supporters of the almost exclusive rôle of diverticula in inflammatory troubles in this quarter. Fitz in 1912 said that the cases comprised in this "inflammatory" group made a fairly complete picture of what must be recognised as a new disease of the lower abdomen—diverticulitis of the left quadrant, analogous to appendicitis of the right quadrant. Bladder and pelvic symptoms are not uncommon.

Various sub-types of the inflammatory group may be distinguished, and a useful clinical classification is as follows:—

1. *Acute and fulminant* (gangrenous).—Symptoms practically identical with acute right-sided appendicitis.
2. *Recurrent.*—Acute or subacute attacks over a long period.
3. Cases ending in *spontaneous recovery.*

Protracted cases.—Those which continue till the clinical picture is changed by one or other of the following developments: (*a*) Simulation of carcinoma; (*b*) intestinal obstruction (acute or chronic); (*c*) bladder perforation; (*d*) general peritonitis; (*e*) incidence of pelvic symptoms.

Trauma.—The mode of onset of many of the acute cases is of interest as showing the great part which trauma of various kinds may play. It has a definite diagnostic value when diverticulitis is under suspicion, and acts as an exciting cause of, at any rate, the acute manifestations. These have occurred straining at stool; during the administration of an enema; following a dose of castor oil; jolting in a motor-car; following a heavy meal; while lifting a weight, jumping, or hunting; while at work; and during an abdominal operation.

In this group pain of one kind or another (often recurrent and colicky) and tenderness are very frequent. Tumour-formation has been noted in 30 per cent. of the cases, and the tumour is not infrequently and then characteristically variable. Abscess-formation is very frequent, consequently fever and leucocytosis are often present. Bladder and pelvic symptoms are not uncommon. Apart from actual fistulous communication with the bladder, which constitutes a separate clinical group, there are frequently symptoms of bladder irritability, probably due to the nearness of inflammatory foci or to actual adhesion. Pelvic symptoms are of some frequency and sometimes make the clinical picture.

Vesico-colic fistula and bladder symptoms generally. In a recent review[7] Bryan has stated that "diverticulitis" is the most frequent cause of sigmo-vesical fistula. Moynihan was the first observer in England to emphasise this fact. He wrote in 1907:—

"The formation of a vesico-intestinal fistula seems to be one of the tendencies of a perforated false diverticulum; a search through the literature has shown that it is far more common than was supposed. In cases where a hard growth in the intestine is accompanied by the passage of flatus and fæces by the urethra, a diagnosis of carcinoma seems irresistible, yet the *probability* is that 'the growth' would be simple, and that the cause of the fistula would be a false diverticulum which had burrowed its way through all the coats of the bowel, and thence through the wall of the bladder, which had become adherent."

Experience has abundantly confirmed the truth of this statement, and its recognition has been followed by some brilliantly successful cases at Leeds, cured by operation after long periods of suffering.

Pelvic syndromes.—Much has been written in recent years about the close pathologic relationship between the sigmoid flexure and the other pelvic viscera. Much of it has been without any or a very extensive knowledge of the rôle of the diverticulum. It is not surprising to find diverticulitis increasingly frequent in the practice of gynæcological surgeons. Pelvic symptoms of one kind or another existed in 7 per cent. of my collected cases, and a number of examples have been placed on record in which the symptoms were entirely pelvic, bowel symptoms being absent. There is no doubt that Shoemaker[8] strikes the right note in saying that in any suspected case of pelvic or utero-ovarian disease a routine and thorough examination of the recto-sigmoidal bowel and its functions is just as important as a vaginal and uterine examination.

Diagnosis.

This can only be made after a careful consideration of all the facts of the case. Inflammatory trouble in the left lower quadrant in a person of middle or advanced age carries with it a strong *prima-facie* possibility of a diverticulitis being the cause, but beyond this exact diagnosis is often difficult, and all special aids to diagnosis may have to be requisitioned. These include (1) the sigmoidoscope, which has been disappointing in the main in this condition, though perhaps some members may have had more fortunate experience; (2) the cystoscope, which has been of particular value in a small number of cases; and (3) examination by X rays. This last procedure holds out most promise, and has been greatly developed during the last few years. As may be expected, the technique is not of the easiest, and there are many fallacies in the appearances noted, but there is no doubt of the general diagnostic value.

The outstanding condition calling for differential diagnosis is carcinoma. It may be, and often is, impossible, not only before operation, but at operation. The following summary of the chief points differentiating diverticulitis from carcinoma may be of use.

1. The absence of the "shadows of malignancy" from the general picture.
2. Tendency to obesity and maintenance of good nutrition generally.
3. Long history of attacks of abdominal pain in the left lower quadrant.
4. History of tumour-formation with subsequent disappearance.
5. Absence of blood (visible to the naked eye) in stools over a prolonged period.
6. Presence of a vesical fistula, in which malignancy can be excluded by cystoscopy.
7. Negative sigmoidoscopy as regards malignant disease.
8. X ray demonstration of diverticula.
9. Pyrexial attacks.
10. Examination of blood, the presence of neutrophilic leucocytosis, and the absence of the specific nuclear changes characteristic of cancer.

[7] Ann. Surg., 1916, lxiii., 353.

[8] Ann. Surg., 1914, lix., 422.

In carcinoma of the sigmoid loss of flesh is early, pain and tenderness are late, and are often preceded by tumour.

There are certain other conditions which have to be considered in arriving at a differential diagnosis. They are: (*a*) sigmoiditis; (*b*) hyperplastic tuberculosis; (*c*) actinomycosis; (*d*) syphilis; (*e*) pelvic conditions generally.

Treatment.

This is comprised in a single word—surgery—unless operative interference is specially contra-indicated. As a physician I shall not venture to discuss particular surgical procedure, but confine myself to a few general points.

In view of the potentiality for mischief of diverticula, all diverticulum-bearing gut should be removed. At operation, search should be made, whenever possible, for further diverticula. Recurrence after operation has occurred, presumably from neglect of this point. There seems to be a special liability to post-operative peritonitis, possibly due to the chronic infection of the inflamed tissues in some cases.

Care should be taken in handling the gut, as at least one instance has occurred of rupture of a diverticulum by surgical traumatism. The good results already obtained in certain bladder fistulæ should stimulate surgeons to deal with such cases. In at least one very successful case the possibility of successful intervention had been negatived by several surgeons of eminence.

Lastly, no case of supposed carcinoma of the lower bowel must in future be regarded as inoperable, either before or at laparotomy, unless diverticulitis has been remembered, fully considered, and systematically investigated.

Leeds.

A SUGGESTED SCALE FOR FEEDING INFANTS ON DRIED MILK.

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IT is now generally recognised that many diseases of early childhood, and in some cases of later life, are due to over-feeding at an early age. This refers more particularly to babies artificially fed than to breast-fed babies, and since in later years dried milks have come very much into use for baby feeding there is a greater tendency towards over-feeding.

While attending the consultations at an infant welfare centre one is soon struck by the great differences in weight of babies of a similar age. If they are bottle fed one finds, with very few exceptions, that, although there may be as much as 3 lb. or 4 lb. difference between their weights at the same age, they are receiving practically the same quantity of milk in 24 hours. The reason for this is that feeds are given according to the age of the child, the weight being considered only in a haphazard way. This occurs more particularly in those cases that are fed on the various "baby foods and dried milks" which bear the instructions for feeding on the covering label. This matter becomes more important under the present difficult conditions when, owing to the decreased value of money, a large number of nursing mothers go out to work in order to lessen their financial troubles, and consequently their babies are no longer breast fed. At the same time, owing to the scarcity of fresh cows' milk, the demand for specially prepared milks has very materially increased, and many local authorities have adopted "dried milks" as the most convenient form of distribution in connexion with a welfare clinic, either at cost price or free in necessitous cases.

A Plan for Feeding Babies in Accordance with their Weight.

Taking these facts into consideration, it is desirable that a more appropriate method of arriving at the necessary feeds should be adopted than by calculating quantities of feeds according to age alone. Therefore it is suggested here that it would be an infinitely better plan to feed a baby in relation to its weight. This method has produced very satisfactory results in Willesden, where it has now been practised for over two years. It might be argued that regular weighing is difficult, but in view of the increasing number of infant welfare centres throughout the country this difficulty vanishes. The middle and upper classes generally have scales at home, or they can have their babies weighed at a chemist's shop.

It is not intended to discuss here the advantages or disadvantages of dried milk for infant feeding, as that has been fully dealt with elsewhere,[1] but only to endeavour to present a scale of feeds that may prove of use to such local authorities or others who adopt this form of milk distribution. The present scale is based chiefly on a full-cream dried milk which has been modified to resemble human milk, but others not so modified have answered satisfactorily when given according to scale.

If the suggested scale of feeds is to be adopted it is essential that it should fulfil the following conditions: 1. It must be practicable. 2. It must be easily understood by doctors, nurses, mothers, or any person having charge of the baby. 3. The calculated amount of feed must produce a satisfactory gain in weight per week. 4. The stools must remain normal.

The investigation was carried out primarily on 69 babies of ages ranging from 3 weeks to 8½ months and weights ranging from 6 lb. 7½ oz. to 21 lb. 1¾ oz. The smallest feed which produced a satisfactory gain, the baby otherwise being in good health, was chosen from the clinic cards and noted. In this way 188 feeds at various weights were obtained. These were arranged in successive increasing weights and an endeavour made to produce a simple formula that could be used for guidance.

It has been the practice of the writer to arrange breast-feeding at intervals of 3 hours, 3½ hours, and 4 hours, according to the age of the child and the progress made. The 4-hourly intervals are begun as early as possible. In the case of the 3-hourly intervals the number of feeds given in the 24 hours is six, in 3½-hourly intervals five feeds, and in 4-hourly intervals five feeds. It has been remarked that in a large number of cases fed every 4 hours four feeds in the 24 hours produce satisfactory results. Accordingly, when a baby is artificially fed this principle is adhered to and only four bottle feeds are given in the 24 hours.

A Formula for Babies' Feeds.

After trying several means of obtaining a suitable formula it was found that by adding the number 9 to the weight if below 7 lb. and the number 10 to the weight from 7 to 16 lb. inclusive the

[1] Report to the Local Government Board. By F. J. Coutts, M.D., B.Sc., D.P.H. (Food Reports No. 24.)

required number of level teaspoonfuls of dried milk to be given in 24 hours was obtained. From 17 lb. upwards when the child is having four feeds in the 24 hours the second figure of the number of pounds' weight is taken as one feed. For example, if the weight is 17 lb. then four feeds are given each containing seven level teaspoonfuls of dried milk. It might just be mentioned at this point that all the various "full-cream dried milks" are reconstituted by a dilution of 1 in 8—i.e., one level teaspoonful to an ounce of water.

This formula will then be as shown:—

Below 7 lb. add 9 to weight = up to 16 level teaspoons in 24 hours.

From 7 to 16 lb. add 10 to weight = 17 to 26 level teaspoons in 24 hours.

From 17 lb. upwards take second figure as one feed = 28 teaspoons upwards.

Table I. shows how the formula works out in practice. The formula was applied to obtain the required feeds of 47 babies attending the clinic

TABLE I.

Age.	Weight in lb., oz.	No. of teaspoons per feed.	No. of feeds.	Intervals in hours.	Total in 24 hours.	Gain.
7 wks.	6 2½	2½, 2½, 2½, 2½, 3, 3	6	3	16	8½ oz. in 7 days.
4 ,,	6 8½	2½, 2½, 2½, 2½, 3, 3	6	3	16	2 ,, ,,
5 ,,	10 0	4, 4, 4, 4, 4	5	3½	20	4½ ,, ,,
5 mths.	12 11½	5½, 5½, 5½, 5½	4	4	22	5 ,, ,,
8 ,,	18 9	8½, 8½, 8½, 8½	4	4	34	6½ ,, ,,

for the first time and which were already being fed on full-cream dried milk, but without proper regulation of feeding.

Another series represents the feeds of 25 babies, calculated according to formula, that were started on full-cream dried milk for the first time. In practically every case a satisfactory gain in weight was procured.

It will probably be argued that there is no guarantee that only the prescribed number of feeds with the proper quantity are given by the mother. In answer to this one may say that the dried milk is strictly rationed and the mother given very definite instructions that she must on no account exceed the quantity prescribed. Also it may be stated that the large majority are necessitous cases, receiving their supply free of charge, and they are informed exactly how long their supply should last. With very few exceptions the supply lasts until the day they are due to receive a fresh lot.

With the increasing scarcity of milk it has become the practice of the writer not to give any more than 30 level teaspoons per day save in exceptional cases. That is to say, when a baby weighs 17½ lb. it receives four feeds per day, each containing 7½ level teaspoonfuls of dried milk. This, when reconstituted, amounts to about 1½ pints. At this point small quantities of fine milk pudding are added, and the results are very satisfactory.

Table II. has been drawn up to show how the feeds may be given according to the formula. It will be noticed that the feeds only rise up to 7 teaspoonfuls given four times, but it must be left to discretion as to whether one ought to give more than 7½ teaspoonfuls four times—equal to about 1½ pints—when the child can assimilate small quantities of milk pudding. It is an established fact that the power of assimilation of infants is

TABLE II.—*Arrangement of Feeds According to Formula.*

Weight in lb., oz.	No. of level teaspoons per feed.	No. of feeds.	Interval in hours.	Total in 24 hours.
6 8	2½, 2½, 2½, 2½, 2½, 3	6	3	15½
8 0	3, 3, 3, 3, 3, 3	6	3	18
11 8	4½, 4½, 4½, 4, 4	5	3½	21½
15 0	6½, 6½, 6, 6	4	4	25
17 0	7, 7, 7, 7	4	4	28
17 8	Same plus ½ teaspoon pudding one feed.	4	4	28
18 0	Plus ½ teaspoon pudding two feeds.	4	4	28
18 8	Plus ½ teaspoon pudding or porridge three feeds.	4	4	28
19 0	Plus pudding or porridge four feeds.	4	4	28

very variable, and, accordingly, one cannot say dogmatically that a child of a given weight should only require a certain quantity of milk in 24 hours. But if a child weighs so many pounds, then by giving a certain minimum quantity we can gauge to a great extent the assimilative power of that child and regulate the feeds accordingly.

The formula given above is not only useful as a starting-point, but can be used for guidance from week to week. A feeding programme can be given for as long as four weeks, so that the mother need not come to the clinic unless something happens to the child in the interval. This is arranged by giving each week one ½ teaspoonful more to the total quantity per day—i.e., one feed is increased by one ½ teaspoonful each week.

A SIMPLE MEANS OF LESSENING OR ELIMINATING ALIMENTARY TOXÆMIA.

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AND
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THE important part played by an alimentary toxæmia in the causation and aggravation of disease is now generally accepted by the medical profession as a whole. The large intestine has been credited in the past as the chief offender in this respect, and many attempts, both medical and surgical, have been made to reduce its power of formation and capacity for absorption of toxins. Sir Arbuthnot Lane has adopted his operation of short-circuiting, a heroic measure to say the least of it, and one not invariably attended by corresponding benefit on behalf of the patient. Metchnikoff and his school have drawn attention to the longevity of certain races of mankind in whom the only common factor was the consumption of some sour-milk product. He therefore assumed that such products, whose active constituent is known to be lactic acid, would produce correspondingly beneficial results in other races.

Assuming, then, that a lactic-acid fermentation in the large intestine is the condition to be aimed at, the problem reduces itself to one of simple chemistry. We know that lactic acid is produced in milk by the fermentation of the lactose by bacteria. We have in the large intestine numerous

bacteria capable of effecting this. We have, therefore, to find some means of supplying the necessary lactose. Carbohydrates administered by the mouth in the usual easily digestible form will not supply this ingredient, as they are broken up and absorbed during their passage through the stomach and small intestine. Thus the carbohydrate must be supplied in some form in which it can resist the action in part, at least, of the gastro-intestinal ferments.

The simplest means of overcoming this difficulty, and the one adopted by us in our practice, is to administer the carbohydrates in the form of coarse uncrushed oatmeal. This may be taken raw or cooked sufficiently to soften the outside of the grain, only leaving behind a hard core. The result is that the partially digested grain reaches the large intestine in the form of carbohydrate. The centre of the grain is composed of unaltered starch, whilst the outer layers, which have been subjected to the digestive action of the juices of the mouth, stomach, and small intestine, are composed of simpler molecules, the disaccharides, and hexoses. Both these latter can be rapidly converted into lactic acid and CO_2 by a suitable bacterial flora.

The fæces of the average individual are neutral or alkaline to litmus, and from what we have already said it would appear that the production of a lactic-acid fermentation was quite a simple matter. This takes place in many cases, more especially when dealing with the young, but there remain quite a large number of individuals whose excreta do not at all readily become acid. It is with this group of cases that we must deal in some detail, as they are the ones that concern us most closely, and we must apply ourselves to the discovery, if possible, of some preventive factor. The causes which may prevent the acid fermentation may be grouped under the following headings: (1) Stasis; (2) presence of unsuitable organisms in the fæcal flora; (3) absence of essential organisms from the fæcal flora; (4) an unsuitable dietary.

1. *Stasis.*

On examining Gram-stained films of the fæces of individuals who are more or less constipated one finds the following bacterial elements: (*a*) Gram-negative bacilli of coliform group; (*b*) Gram-positive cocci and diplococci and short chains of streptococci; (*c*) Gram-positive and Gram-negative bacilli containing spores; (*d*) Gram-positive coarse bacilli without spores (Bulgarian group). In a case where stasis is marked those classified under (*a*), (*b*), and (*c*) will all be present in fæcal films in large numbers, whilst (*d*) will only be found after some search. On the other hand, films from a case where stasis is absent will show a very different picture—that is, complete absence of spore-bearing bacilli, very few streptococci, a large number of bacilli of the Bulgarian group, and the remainder coliform organisms. Another difference between the two microscopic preparations will be seen; in the first the definition of the organisms will be poor and the stain taken up irregularly, whilst in the second specimen the converse will be the case. However, the most marked difference between the two specimens is to be found in the relative proportion of the Bulgarian to the coliform organisms. In the first case they may be in the proportion of 1–250 coli, whilst in the second case they may constitute a much higher ratio—e.g., 1–5. Thus this ratio, which one may legitimately term the "Bulgar Index," can be accepted as an indication of the presence or otherwise of intestinal stasis.

On abdominal examination of cases in this group one will probably find that there is some enteroptosis of the transverse colon, and on percussion of the gut in the neighbourhood of the cæcum dullness may be elicited. In such a case deep abdominal massage may be the determining factor in producing lactic-acid fermentation. This we consider to be a very powerful adjuvant in procuring the required result, for not only does it act by causing the contraction of the muscular walls of the gut, and the consequent propulsion of the contents, but also by improving the blood-supply of the gut wall it increases the secretions into the lumen. It is also essential that the oatmeal should reach the large intestine without too much delay; for this purpose again the abdominal massage is most useful.

Aperients may also be required. We find aloin is generally most useful. Calomel may be used occasionally, but should not be given too frequently as it appears impossible to maintain a lactic fermentation if any mercury is being administered. Liquid paraffin is also contra-indicated, as it again prevents this fermentation from taking place, possibly by forming a film-coating over the oat grains, and so preventing their interaction with the necessary bacteria.

In long-standing cases of stasis matters may be somewhat accelerated by washing out the large intestine at the commencement of treatment. The possibility of stasis must not be overlooked in a patient who gives a negative history as regards constipation, for on examination these may prove to be well-marked cases in whom the daily action is to be regarded merely as being an overflow from an already full cesspool.

2. *Presence of Unsuitable Organisms.*

Should a case resist the above measures, it will next be necessary to plate out the fæces on some differentiating medium. MacConkey's neutral red-bile salt-peptone-lactose-agar we have found to be the most generally used for this purpose. A thorough search for any non-lactose fermenters should be made, and in an obstinate case the examination should be repeated on several occasions before definitely excluding their presence. Should any non-lactose fermenters of the coliform group be present, a vaccine of this organism should be administered, for, from experience, it appears that the presence of a very small proportion of organisms of this class are fatal to the production of the desired fermentation. Usually after a few doses of an autogenous vaccine the invader disappears and the patient's stools become acid.

The organisms of this type most frequently encountered give the following sugar reactions: lactose, 0; glucose and mannite, acid and gas; dulcite and saccharose, 0. For the sake of convenience we call them enteritidis group; they do not usually agglutinate with the patient's own blood serum, nor with any of the high-titre sera of the paratyphoid group.

Other organisms met with which are apparently equally capable of preventing the desired result are *B. coli mutabile*, *B. fæcalis alcaligenes*, *B. proteus*, and, more rarely still, organisms of the dysentery group. Other cases may prove to have a large excess of *Streptococcus fæcalis*, which again may inhibit the desired reaction. Thus it is advisable to conduct fæcal examinations from the commencement, for not only do they assist one in

diagnosis and prognosis, but a sure guide of the patient's progress may be obtained from the "Bulgar Index." Also much valuable time may be saved by the discovery at any early stage of a non-lactose fermenter.

3. *Absence of Essential Organisms from Fæcal Flora.*

This class of case may be recognised by the failure to produce acid fermentation, in spite of the fact that severe stasis has already been relieved, and by the failure to isolate non-lactose fermenters from the stool. In such instances the fæcal films do not show a good "Bulgar Index," but the proportion of the Bulgar group to the coliform organisms remains about 1–40. These require a sour-milk preparation which is rich in the required organisms.

4. *Unsuitable Dietary.*

For reasons not well understood there are some articles of diet which effectually prevent a lactic-acid reaction being maintained. The most notable of these are whisky, asparagus, pears, and salmon. After all the measures already detailed have been tried there will still remain a small residue of cases in whom one cannot produce an acid fermentation and who are not materially benefited by the treatment. For this reason it is obvious that the possible criticism that the beneficial results of the treatment are due merely to the amount of purging the patient is subjected to, cannot stand. The presence of the lactic-acid fermentation appears to be an essential one, and once this is obtained the rapid results achieved are almost incredible. Possibly the explanation is merely one of improved drainage—that is, the large intestine becomes much less tolerant to an acid content and therefore is in a constant state of peristalsis.

We are of opinion that this is not the sole explanation, for were it so one would expect much more frequent evacuations of the bowel, whereas in actual practice two, or at least three evacuations in the 24 hours are all that are necessary for the maintenance of the acid reaction. The facts that the offensive odour of the stool is rapidly lost on attaining the lactic-acid fermentation, and that the ordinary products of putrefaction (indol and skatol, &c.) are rapidly reduced in quantity, render it probable that the lactic acid actually exerts an antiseptic action on the organisms concerned in these processes.

One of us (R. C.-S.) has been combining this course of treatment with the ordinary symptomatic methods in his medical practice for the last 15 years. During this period the treatment has become more elaborated, and some of its difficulties realised and overcome. Failures have been met with, but they have all been failures in that the lactic-acid fermentation could not be obtained. In all cases where this fermentation has been established the condition of the patient has been materially improved. We select the notes of a few typical successful cases.

Typical Cases.

CASE 1.—Mrs. C., aged 48. Rheumatoid arthritis. Disease commenced in 1905 in wrist-joint, spreading later to the small joints of hands and feet. First seen in 1908 when the disease was well advanced; there were typical swelling and deformity of small joints of hands and feet and wrist, the knees also were commencing to become involved. The treatment was continued for 12 months and considerable benefit was derived, pain being much diminished and the progress of the disease being temporarily arrested. Treatment was then discontinued until 1913, and the patient once more became bedridden owing to deformity and pain of the knee-joints. A lactic-acid fermentation was once more established in July, 1913, and maintained with rare remissions until March, 1914, when she could walk with comparative ease and comfort. Since this time she has been able to perform all her housework. The treatment was discontinued two years ago, and it is only at the present time that the disease shows signs of renewed activity.

Note.—In this case treatment was not commenced until late when bony deformity was marked, but, in spite of this, progress has been completely arrested.

CASE 2.—Mrs. W., aged 57. Severe neurasthenia. Seen first in 1912, when headaches, insomnia, loss of memory, and palpitation were marked. At this time she also suffered from attacks of semi-collapse which lasted for 24 hours or more, when she would remain in a lethargic state. These attacks had been getting more frequent and occurred every four or five days; during them she appeared bloated and repulsive-looking, and to her friends had the aspect of a drunkard. She had no wish to live. On examination her heart was found to be dilated, cardiac dullness extending to one inch outside the mid-clavicular line; mental dullness and apathy were marked. Dullness over the cæcum was present, and the transverse colon had dropped to the brim of the pelvis. A lactic-acid fermentation was established in the large gut after three weeks' treatment and was at first maintained with considerable difficulty. Improvement commenced after a month's treatment and was at first manifested by a lengthening of the interval between the attacks. After 12 months she had regained her normal health and has since remained quite well.

CASE 3.—Mrs. H. J., aged 42. Ulcerative colitis. First seen in 1910. Illness commenced in 1905, and for the following five years she suffered from intermittent attacks of general abdominal pain, which had no relation to the taking of food. The pain was so severe that at times morphine had to be administered. She was habitually constipated, though attacks of diarrhœa occurred not infrequently. Blood and mucus was commonly passed during these attacks. She also suffered from severe attacks of depression and palpitation. Treatment commenced in May, 1910. Lactic-acid fermentation was easily established by means of oatmeal and massage. Symptoms rapidly cleared up, and the patient has shown no signs of any relapse.

CASE 4.—A. G., aged 17. Asthma. The patient had suffered from asthmatic attacks since a baby of six months. The attacks were characterised by a difficulty in breathing and "stuffiness" of the upper air-passages. At the end of 1916 he was having severe attacks of typical asthma, lasting about three days once a fortnight; during the attacks he was very breathless, having to sit up and fight for breath. There was no sputum. These attacks were commonly brought on by indigestion or head cold, the former being a very troublesome symptom throughout. His tonsils and adenoids were removed in 1912, after which there was a considerable improvement for a year. Commenced treatment in January, 1917. A lactic-acid fermentation in the large intestine was easily established by means of abdominal massage, oats, and aloin; improvement was very rapid, no definite attack of asthma since February, 1917. He is now able to eat anything, plays football, cricket, &c., and has not lost a day from work or school since that time.

CASE 5.—J. M., aged 42. Severe toxæmia presenting clinical picture of neurasthenia. Chief symptoms, headache, sleeplessness, palpitation, and loss of memory. History of two years' illness. On examination he was found to have a marked anæmia and some cardiac enlargement; no physical signs in the nervous system. Practically no improvement followed early efforts in treatment, and a lactic-acid fermentation could not be established. Three fæcal specimens had been examined without the isolation of any non-lactose fermenters. The plate of the fourth specimen showed 50 per cent.

colonies of an organism of "Enteritidis" group. An autogenous vaccine was administered. Five weeks later a lactic-acid fermentation was established, and the patient rapidly recovered normal health.

From the above rather dogmatic statements it may perhaps be thought that we advise this line of treatment as a "panacea of all ills," but this is not the case. What we do maintain is that a lactic-acid fermentation in the large intestine is a most desirable possession, both in health and disease, and that if it can be produced in the latter so much the better. We are not advocating that all other symptomatic or specific treatment should give way to the suggestions we have made, but we do think that, wherever possible, they should be combined with it.

THE PARATYPHOID B GROUP.

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SINCE Bainbridge and his collaborators in 1911 declared that it was possible by means of the absorption test to differentiate between Aertrycke and paratyphoid B organisms, various workers have attempted to prove the invalidity of the differentiation, while others have advocated the use of certain cultural tests to supplement the serological characterisation of the two groups.

During the examination of a number of strains the present writer has come to the conclusion that not only, as is becoming universally recognised, is it possible to differentiate, by the investigation of their respective absorptive characters, an Aertrycke bacillus from a paratyphoid B, but to subdivide, by means of the same test, the Aertrycke organisms into a number of types.

Fallacies in Classification by Clinical and Cultural Methods.

There are three main biological features which might be of use in the classification of paratyphoid B–Aertrycke members of the Salmonella group—their clinical manifestations, their cultural characters, and their serological characters. The clinical manifestation is not to be accepted as a guide to the nature of the causative organism in every case, and it is doubtless the failure to recognise this fact which has influenced Uhlenhuth in deciding that Aertrycke and paratyphoid B organisms are identical.

Bainbridge and Dudfield[1] have published a case of acute gastro-enteritis due to what was serologically paratyphosus B, while this paper will bring evidence of illness of an enteric nature presumably due to an organism which must undoubtedly be placed, according to the agglutination and absorption tests, among the "Aertryckes." Uhlenhuth,[2] it will be remembered, started out with a number of strains labelled paratyphoid B, suipestifer, food-poisoning bacteria, psittacosis, &c., and proceeded to show that some suipestifers remove paratyphoid B agglutinins from paratyphoid B serum, while some paratyphoid B strains do not. It is clear, then, that two groups of organisms, one absorbing and the other not absorbing a certain type of specific agglutinins, have been demonstrated, but the significance of the result was disregarded because the grouping did not tally with a previous labelling, which was doubtless clinical or zoological, in the sense that the psittacosis was isolated from a parrot and the suipestifers from pigs. If the absorption test may be discarded because two strains differentiated by it cause diseases clinically resembling one another, why should one not proceed further on the same lines and refuse to pay attention to the agglutinatory and even cultural differences of organisms such as paratyphoid A and B, which resemble one another so greatly in their clinical manifestations.

In differentiating strains by means of their cultural reactions one deals with a test of a much simpler nature than that afforded by an animal body during the process of infection, and a number of characteristics have been suggested for this purpose in the case of the organisms here under consideration; for instance, the fermentation of dulcite,[3] the production of H_2S in lead acetate agar,[4] and the reduction of fuchsin in glucose serum water.[5] Whatever groups of Salmonella organisms may be mapped out by these tests the response by the ten paratyphoid B and 46 Aertrycke strains, serologically diagnosed and investigated here, was practically identical with that of the paratyphoid B group as described by Krumwiede, the only exceptions being hog cholera Arkansas (an "Aertrycke" of uncertain origin) and Kruse (an organism identifiable as belonging to the same type of "Aertrycke" as 23 other strains not giving this cultural reaction). These two organisms gave the fuchsin and lead acetate reactions, characterised by Krumwiede and his fellow workers as indicative of the suipestifer group, but on the other hand did not behave like suipestifers in dulcite peptone water; both fermented this, hog cholera Arkansas after some inducement (subculturing through dulcite) giving both acid and gas in two days, and Kruse, though it so far refuses to give any gas, having always produced acid well after one day's incubation.

These cultural reactions, therefore, do not serve to differentiate, and may even, as is recognised, cut across serological groups; the organism Kruse, for example, belongs, by virtue of its agglutinogenic and absorptive properties, to a very definite Aertrycke group, but differs from all its fellow members in not reducing fuchsin in Krumwiede's glucose serum water, not producing H_2S in lead acetate agar, and not producing gas in dulcite. Dulcite is notoriously uncertain as regards fermentation, though the only other "Aertrycke" that has so far consistently refused to do more than produce acid is one isolated in Port Said, which, in respect of all the usual carbohydrates, is a non-gas-producing variety.

Krumwiede, Kohn, and Valentine recognise a group of organisms which correspond culturally with paratyphoid B, although they fail to do so absorptively. These organisms, which he labels B. choleræ suis (intermediate types), would agree, then, in the main with the "Aertryckes" here described.

The Value of Serological Tests in Classification.

It has been seen that the type of illness associated with a particular organism does not necessarily serve to indicate how that organism should be classified, and also that it has not been possible to differentiate paratyphosus B from "Aertrycke" and the various "Aertryckes" from one another by cultural tests; what, then, are the serological differences which have served to trace out these groups?

The form in which the absorption test was carried out is as follows: ½ c.cm. of the serum to be absorbed in a 1/50 dilution (titre about 1 : 6000) is added to one agar slope of culture (25–35,000 million organisms) rubbed down into ½ c.cm. saline;

absorption for one hour and agglutination for two hours at 37° with a fresh living watery suspension of bacteria. All agglutinating sera were made by the intravenous inoculation of rabbits with heat-killed emulsions.

Owing to the complexity of the reaction and the difficulty of reading the results, the introduction of a *tertium quid* should be avoided in the absorption test. By this is meant an attempt to see if X can, for example, remove Y agglutinins from a Z serum. Only by discovering whether X can remove the specific agglutinins from Y serum can light be easily thrown on the relationship between the two organisms X and Y.

As Kruse[6] has pointed out in connexion with his work on the dysenteries, in establishing the absorptive relationship between two organisms, X and Y, it may be necessary not only to test X's power of absorbing specific Y agglutinins, but also Y's capacity for removing specific X agglutinins. This has been the writer's experience also, and may be the case for two reasons. X may agglutinate badly with Y serum, in which case it has always been found that it will absorb equally badly. For instance, the case of the organism Piper I., isolated from the urine of a paratyphoid convalescent six weeks after the onset of illness—typical para. B. was isolated from the fæces on the same day; five days later normal para. B only was recoverable from the urine. (Table I.)

TABLE I.

Paratyphoid B serum.	Agglutination against—	1/200	1/400	1/800	1/1600	1/3200	1/6400	1/12800
Unabsorbed.	Para. B Tidy.	+++	+++	+++	+++	+++	+++	+
	Piper I.	+	–	–	–	–	–	–
Absorbed with Piper I.	Para. B Tidy.	+++	+++	+++	+++	+++	+++	+++

Controls –.

While culturally Piper I. resembled para. B, agglutination and absorption with para. B serum did not further the diagnosis; it was only after preparing a Piper I. serum and carrying out an inverse or "mirror" absorption test that the fact was revealed that Piper I. was a true paratyphoid B, a typical Schottmüller removing from the Piper I. serum all its specific agglutinins. (Table II.)

TABLE II.

Piper I. serum.	Agglutination against—	1/200	1/400	1/800	1/1600	1/3200
Unabsorbed.	Piper I.	+++	+++	+++	+	–
	Para. B Tidy.	++++	+++	+++	+	–
Absorbed with Para. B Tidy.	Piper I.	–	–	–	–	–

Controls –.

On the other hand, a strain may agglutinate well with a certain serum and yet not absorb the specific agglutinins sufficiently to justify diagnosis.

T 4 F 6 is a culture isolated from the fæces of a mouse dying five days after feeding with para. B Tidy.

TABLE III.

Para. B Tidy serum.	Agglutination against—	1/200	1/400	1/800	1/1600	1/3200	1/6400	1/12800
Unabsorbed.	Para. B Tidy	++++	++++	++++	++++	+++	+++	–
	T 4 F 6.	++++	++++	++++	+++	+++	+++	+
Absorbed with T 4 F 6.	Para. B Tidy.	++	++	++	++	++	+	–

Controls –.

Whether this strain fished from the fæces plates is a selected "sub-strain" of the original Tidy, an altered Tidy, or even an alien paratyphoid B strain altogether, does not matter here; it illustrates the type of organism which while agglutinating does not absorb completely. (Table III.)

In spite of its being a good agglutinator, T 4 F 6 absorbed specific para. B agglutinins too poorly to settle its identity, but the "mirror" test was conclusive; paratyphoid B removed the specific agglutinins from a T 4 F 6 serum completely. (Table IV.)

TABLE IV.

T 4 F 6 serum.	Agglutination against—	1/200	1/400	1/800	1/1600	1/3200	1/6400
Unabsorbed ...	T 4 F 6	++++	++++	+++	+++	+++	–
	Para. B Tidy	++++	++++	+++	+++	+++	–
Absorbed with Para. B Tidy.	T 4 F 6	–	–	–	–	–	–

Controls –.

Thus it has been found that in a certain number of cases where the strain under examination is an "inagglutinable" para. B like Piper or one resembling T 4 F 6 in character, the "mirror" as well as the usual absorption test is needed to complete diagnosis, though in most cases para. B organisms of the Schottmüller type disclose their identity by at once absorbing the specific agglutinins of a para. B serum. Both forms of the test, however, are necessary in the diagnosis of an "Aertrycke"; the complete qualifying conditions being that the organism falls culturally within the bounds of the paratyphoid B group, and while either an active or a passive agglutinatory relationship to the paratyphoid B of Schottmüller is shown (i.e., either its serum agglutinates para. B, or the organism is agglutinated by para. B serum) no absorption by either organism of specific agglutinins from the other takes place.

Differentiation of B. Paratyphosus B *into Various Types.*

The serological relationship between "Aertrycke" and paratyphosus B having been so far established, it remained to be seen how the various "Aertrycke" strains stood towards one another, and the absorption test at once demonstrated the fact that there was a variety of "Aertrycke" types, differing from one another in exactly the same way as "Aertrycke" strains in general differ from paratyphoid B—i.e., the specific agglutinins of one "Aertrycke" type are not absorbable by an "Aertrycke" of another type. It is, of course, again necessary to carry out both forms of the test (to absorb X with Y as well as Y with X) before two organisms can be definitely declared of different types.

Working on these lines, the writer has been able to relegate the 46 "Aertrycke" strains into a number of types (the differentiation of the "Mutton" and "Newport" types has already been published by Captains H. Marrian Perry and H. L. Tidy, R.A.M.C.[7]), as tabulated below.

"Aertrycke" Strains.

1. *Mutton Type.*
   - Mutton. (Food-poisoning outbreak, Newcastle, 1911.)
   - H. (Food-poisoning case, Dublin, 1915.)
   - Hearfield. (Isolated by Captain Fletcher, R.A.M.C., from fæces and urine of dysentery carrier, Southampton, 1917.)
   - Wells. (Isolated from food-poisoning case by Captain Fletcher, R.A.M.C., Southampton, 1917.)
   - Port Said. (Isolated by Captain A. H. Priestley, R.A.M.C., from case during food-poisoning epidemic, Port Said, 1917.)

Allen, Blackwell, Dodds, Strong, Woodhead. (Isolated by Lieutenant-Colonel Martin, A.A.M.C., from cases in food-poisoning epidemic, France, 1918.)
A, B. (Received from Captain Perry, R.A.M.C., sporadic cases of gastro-enteritis, France, 1918.)
Brooks. (Isolated by Captain Fletcher, R.A.M.C., from fæces of Shiga carrier, Southampton, 1918.)
Amara. (Isolated from epidemic in guinea-pigs, by Major Gloster, I.M.S., Mesopotamia, 1918.)
Calf 6. (Isolated from epidemic in calves, by Captain Lawrence, R.A.V.C., Mesopotamia, 1918.)
Barnes, Hawker, Phillips, Stock. (Isolated by Surgeon-Captain Bassett-Smith from food-poisoning cases, Greenwich, 1919.)
Fulham Child. (Fatal food-poisoning case, London, 1902.)
Psittacosis. (Laboratory strain. Presumably of avian origin.)
G. Lab. (Laboratory strain. Of unknown origin.)
Kruse. (Laboratory strain. Of unknown origin).
Wassermann. (Laboratory strain. Of unknown origin.)

2. *Hirschfeld Type.*
Priddis. (Isolated from case diagnosed as P.T.A. Peshawar, 1914 or earlier.)
Hirschfeld's "Para. C"[10] (From case of enteric nature, Salonika, 1916.)
Baghdad strains (9). (Isolated by Macadam,[11] Mackie and Bowen[12] from cases of enteric nature, Baghdad, 1918.)
Witts. (Obtained from Professor Andrewes. Isolated from case at St. Bartholomew's Hospital, 1919.)

3. *Newport Type.*
Newport. (From food-poisoning case, Newport, 1915.)
Fentry, Hough. (Isolated by Captain Perry, R.A.M.C., from food-poisoning cases, France, 1918.)

4. *Stanley Type.*
Stanley. (Isolated by Professor Hutchens from case of food poisoning, Stanley, 1917.)
Britton. (Isolated by Captain Fletcher, R.A.M.C., from fæces, urine, and blood of case of enteric nature, Southampton, 1917.)

5. *Binns Type.*
Binns, Timson. (From food-poisoning cases, France, 1917.)

6. *Arkansas Type.*
Hog Cholera Arkansas. (Laboratory strain: Of unknown origin.)

7. *G. Type.*
G. (From mesenteric gland of monkey dying during experiment on dietetics. London, 1917.)

8. *Reading Type.*
Reading. (From water-supply. Reading, 1916.)

Five of the types will be seen to be definitely associated with disease in man, being represented by 24, 12, 3, 2, and 2 strains respectively.

The *Mutton* group claims over 50 per cent. of the strains, and would appear to be the most important; it includes strains from various countries and from animal as well as human epidemics; all members, as far as is known, gave rise to acute gastro-enteritic symptoms in the human cases.

The *Hirschfeld* group is, so far, a more or less geographical as well as serological entity; all cases have occurred in the East or had close connexion with Eastern countries. The clinical symptoms have been those of enteric. Further reference to this group will be found later in the paper.

The *Stanley* group is interesting in that while one member (Stanley) came from an acute gastro-enteritis, the other (Britton) was isolated on the fourth day of illness from the fæces, urine, and blood of a case clinically resembling paratyphoid fever, and was the only organism found.

Variability of Bacteria.

It is still too soon to say how constant and dependable these types are. The whole Salmonella group is considered a particularly variable one. Baerthlein[8] claims to have produced variation in paratyphoid B towards *B. typhosus;* Sobernheim and Seligmann[9] have grown strains which they regard as intermediaries between Gärtner and paratyphoid B. The only variation, however, met with in the course of this investigation has been what appears as more in the nature of a disclosure of identity, the organism becoming more agglutinable, more responsive to serological experimentation, than in the nature of a change of character necessitating the transference of the organism from one group to another. An illustration of this is afforded by the behaviour of the "Aertrycke" culture, Hearfield, which agglutinated badly with Mutton serum soon after isolation in 1917, and consequently did not absorb specific Mutton agglutinins; it was regarded as not being of the Mutton type. The making of a Hearfield agglutinating serum was frustrated on more than one occasion by the unexpected toxicity of this strain, otherwise the relationship to "Aertrycke" Mutton might have been established at once; it was only when the organism was re-tested in 1919 (with the same Mutton serum) that it could be grouped without the help of homologous serum. Hearfield had now lost its primary inagglutinability and came down to titre limit, and removed the specific Mutton agglutinins completely.

While, in the light of work done on the variability of bacteria, the possibility of impermanence in the membership of the groups here described cannot be denied, it would seem as if a sufficient degree of stability has been demonstrated to warrant attention being drawn to their existence. The acid agglutination test of Michaelis was not found useful in classifying the strains. For, although a certain correspondence was sometimes apparent, for instance, with Michaelis's lactic acid-sodium lactate mixture, all three members of the Newport group gave two agglutination maxima, the 2nd and 5th tubes, and the maximum of both organisms of the Stanley group was in the 4th and 5th tubes, yet, for the most part, the results were sufficiently confusing to prevent any classification; the Mutton group had members with maximum agglutination in the 3rd, 4th, 5th, 6th–7th, and 3rd–9th tubes. The tube of predilection for the majority of all "Aertryckes," as of paratyphoid B strains, was the 5th.

Estimated Relationship between Different Serological Types of B. paratyphosus B.

Apart from the constancy of these serological types the extent of their independence, one from another, has to be considered. It has been already stated that the "Aertrycke" types differ from one another in the same way as they all differ from the paratyphod group, but when one applies a test which, like the absorption one, is capable of detecting the finer serological differences betwen bacteria, one may expect to bring to light intermediaries existing between what are after all very closely related groups of bacteria, and this has happened apparently in one case, that of the strain Brooks. This organism, in virtue of its power of absorbing specific agglutinins from Mutton serum, has been placed in the group of that name; but it is also capable of absorbing specific agglutinins from Binns serum and must therefore be regarded as an intermediate strain between these two groups. There is this, however, to consider: the Binns group (two strains from the same epidemic) is not as sharply circumscribed as the others; it shows

marked relationship to the Mutton group, as the following absorption tables (V. and VI.) illustrate. The same result is obtained with the other strain, Timson.

TABLE V.

Binns serum.	Agglutinated against—	1/200	1/400	1/800	1/1600	1/3200	1/6400	1/12800	1/25600
Unabsorbed.	Binns.	++++	++++	++++	++++	++++	+++	++	–
	Mutton.	+++	+++	+	+	+	–	–	–
Absorbed with Mutton.	Binns.	+++	+++	+++	+	–	–	–	–

Controls –.

TABLE VI.

Mutton serum.	Agglutinated against—	1/200	1/400	1/800	1/1600	1/3200	1/6400	1/12800
Unabsorbed	Mutton.	++++	++++	+++	+++	+++	+	+
	Binns.	+++	+++	+++	+++	++	++	+
Absorbed with Binns.	Mutton.	++++	++++	+++	+++	–	–	–

Controls –.

Special mention must also be made of the Hirschfeld group, members of which have been labelled by some workers,[10 11 12] paratyphoid C. That this is not an historically correct classification is probable. Paratyphoid C, as described by Uhlenhuth[13] in 1908 and by Heimann[14] and Sobernheim[15] in 1912, is a Salmonella with no agglutinogenic relationship, either active or passive, to paratyphoid B. And while a number of strains in the Hirschfeld group remain unagglutinated by paratyphoid B serum, others do respond to a greater or less extent, and all give sera which agglutinate paratyphoid B strains to a considerable degree.

The following table (VII.) illustrates the varying extent of agglutinatory relationship existing between paratyphoid B and the Hirschfeld group; some badly agglutinating paratyphoid B and "Aertrycke" strains (not of the Hirschfeld group) are included for the sake of comparison.

TABLE VII.

Type to which strain conforms.	Paratyphoid B serum agglutinated against—	1/100	1/200	1/400	1/800	1/1600	1/3200	1/6400	1/12800
Schottmüller's Para. B.	Para. B Tidy.	++++	++++	++++	++++	++++	++++	+++	+
	" Lister.	++	++	++	++	++	–	–	–
	" Edinburgh.	–	–	–	–	–	–	–	–
Hirschfeld's Para. C.	"Aertrycke"—								
	" Hirschfeld.	+++	+++	+++	+++	++	+	–	–
	" Witts (blood strain).	–	–	–	–	–	–	–	–
	" Witts (urine strain).	++	++	++	++	+	–	–	–
Newport.	" Newport.	++	++	++	++	+	+	+	–
Mutton.	" Wassermann.	–	–	–	–	–	–	–	–
	" Psittacosis.	++	+	–	–	–	–	–	–
	"Aertrycke" Baghdad 41 serum agglutinated against—								
Hirschfeld's Para. C.	"Aertrycke"—41	++++	++++	+++	+++	+++	+++	++	–
	Baghdad 31	+++	+++	+++	+++	++	++	–	–
Schottmüller's Para. B.	Para. B Tidy.	+++	+++	+++	++	++	–	–	–

Controls –.

The agglutinatory relationship, both active and passive, of paratyphoid B to the Hirschfeld type of organism may not be as well marked as it is to most "Aertrycke" types, but, as is seen in the above table, it frequently equals, or even exceeds, its relationship to certain organisms undoubtedly "Aertryckes," and, indeed, to some paratyphoid B strains themselves.

The only fundamental distinction between the Hirschfeld group and paratyphoid B is that afforded by the absorption test; it has therefore been considered to show sufficient serological relationship to paratyphoid B to be placed alongside it and the other "Aertrycke" types, rather than be accorded a position as far removed as that of *B. enteritidis Gaertner* and *B. paratyphosus C* (of Uhlenhuth). Unlike those of the Hirschfeld type, these latter organisms have no agglutinins in common with paratyphoid B and the "Aertryckes."

Nomenclature.

Apart from the question of relationship lies the question of nomenclature. In this paper the Hirschfeld type of organism has been regarded as an "Aertrycke." Hirschfeld labelled his strain paratyphoid C. Historically, the name paratyphosus C belongs to the organism which was described by Uhlenhuth as long ago as 1908 and by others since, and which, according to published accounts (a culture of this bacillus has not so far been obtainable), does not resemble serologically the Hirschfeld type. In view, however, of the so far constant association of illness of an enteric nature with the Hirschfeld type of bacillus, it may eventually be decided that the term paratyphosus C is more reasonably applicable to it than to Uhlenhuth's organism, which, apparently, has been isolated from human beings only in cases of acute gastro-enteritis. On the other hand, as it does not appear possible to limit consistently the term paratyphoid to organisms manifesting themselves clinically by disease of an enteric nature (Cf. Bainbridge and Dudfield's organism), there may be less reason for transferring the term paratyphosus C from one organism, to which it has been already applied, to members of the Hirschfeld type.

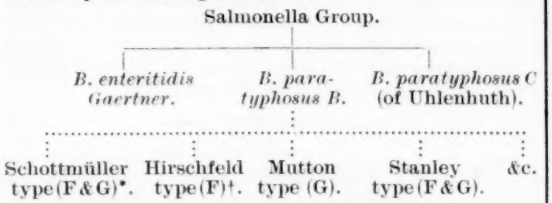
We have here, then, a series of organisms which includes Schottmüller's para. B, Hirschfeld's para. C, and the various types of what have been called "Aertrycke" organisms, all identical culturally, all resembling one another agglutenogenically to greater or less extent, but each type differing from the others in not being able to absorb their specific agglutinins. So long as there appeared to be but two types in this group of the Salmonellas, one represented by Schottmüller's organism and the other by De Nobele's Aertrycke bacillus, there was little need to find a name in common for them, but, with the recognition of an increase in the number of types, it has been considered justifiable and advantageous to classify them under one heading, and simplest to give this group the name of paratyphoid B. The alternative of naming the group after Durham or De Nobele, who first marked it off by the agglutination test, would still have left one with the task of inventing a whole series of new "species" names for the various types now found to exist alongside of para. B and *B. enteritidis Aertrycke.*

It is suggested, therefore, that the group be called paratyphoid B and the various subgroups regarded as so many different types of paratyphosus B—e.g., the Schottmüller type, the Hirschfeld type, and so on. The term "Aertrycke" has been omitted, as it is not yet known to which type De Nobele's strain belongs. Should, however, the Aertrycke bacillus, as is quite likely, be found to correspond with the Mutton strain it would, of course, serve as the prototype, and give its name to the group at present labelled Mutton. This amalgamated paratyphoid B group will almost certainly be found to be a very widespread and

extensive one, comprising many "types" and including many of the strains obtained from diseased and healthy pigs which have been labelled *B. suipestifer*.

The Salmonella group would thus fall into two divisions (or three if paratyphosus C of Uhlenhuth is established as a separate entity), which are distinguishable one from another by the agglutination reaction, active and passive. The paratyphoid B group, with which the writer has been concerned, is further divided into types by the application of the absorption test.

Diagrammatically, the relationship of the various groups may be expressed as below. (The continued lines lead to groups differentiated by the agglutination test; the dotted lines lead to groups differentiated by the absorption test.)



* Prototype: *B. paratyphosus B* of Schottmüller.
† Prototype: *B. paratyphosus C* of Hirschfeld, MacAdam, Mackie, and Bowen.
F = Known to occasion continued fever in man.
G = Known to occasion acute gastro-enteritis.

Conclusions.

1. By means of Castellani's absorption test it has been possible to divide the "Aertrycke" group of organisms into a number of types, of which one (Mutton type) is by far the most largely represented, 24 organisms from 16 foci belonging to this type out of 46 strains from 28 foci.

2. As the various "Aertrycke" types serologically agree with, and differ from, one another in the same way as each agrees with, and differs from, paratyphosus B, the "Aertryckes" and paratyphoid B have been placed together in one group, of which they thus represent a series of types. There is some evidence for concluding that just as paratyphosus B may occasionally produce acute gastro-enteritis in man, so may a typically Aertrycke-like bacillus occasion continued fever resembling enteric. Thus there seems no good reason for separating one para. B type off from a series of Aertrycke or otherwise named types, and it is suggested as simple and justifiable that paratyphosus B be used as species-name for the whole group, the particular variety being indicated by the addition of a type-name, such as Schottmüller, Mutton, Hirschfeld, and so on.

3. Reasons for regarding as a member of the paratyphosus B group that organism which in the East is apparently of particular importance, and has been called by some workers paratyphosus C,[10 11 12] are here set forth, and the question of nomenclature is considered.

I wish to express my obligation to Professor F. W. Andrewes, Surgeon-Captain P. W. Bassett-Smith, Captain W. Fletcher, Professor H. J. Hutchens, Lieutenant-Colonel J. C. G. Ledingham, Lieutenant-Colonel C. J. Martin, Captain H. Marrian Perry, and Captain A. H. Priestley, and my gratitude for their kindness in supplying me with cultures and details of the cases in their charge.

References.—1. Bainbridge and Dudfield: Journ. Hyg., 1911, xi., p. 24. 2. Uhlenhuth, Hübener, Xylander, and Bohtz: Arb. a.d. kais. Gesundhamt., xxx., p. 217. 3. Jordan: Journ. Infect. Diseases,
(Continued at foot of next column.)

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

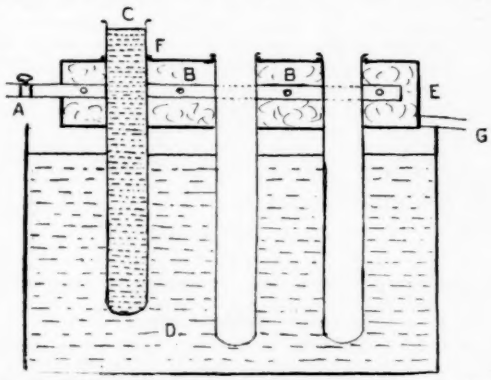
DETECTION OF ALBUMIN IN URINE:

A WHOLESALE METHOD OF HEATING TEST-TUBES.

BY GUY BOUSFIELD, M.B., B.S. LOND.,
FLIGHT-LIEUTENANT, R.A.F.M.S.

IN hospital practice the testing of a large number of urines for the presence of albumin is a matter of daily routine, and involves considerable waste of time in heating individual test-tubes over the flame. The method described below was devised with a view to time-economy, but was found afterwards to give very sharply defined results.

The apparatus consists of a flat copper steam bath, 1¼ in. deep, which is made in sections that do not communicate with each other. The upper and lower surfaces of the bath are perforated with holes, to allow of the insertion of well-fitting glass test-tubes (see figure).



A, Steam-supply pipe and cock. B, Perforated metal pipe, for steam-supply within bath. C, Test-tube, slightly raised, containing urine. D Cold-water bath. E, Steam bath. F, Raised rim to facilitate tube removal. G, Outlet pipe for condensation water.

The edges of the upper set of holes are slightly raised in order to facilitate the removal of the tubes. By this arrangement it will be seen that the heating element encompasses the upper inch or so of the test-tubes, and that owing to the division of the interior of the bath, any number of sets of tubes from, say, 5 to 40, may be subjected to the steam, allowing the apparatus to be adjusted to the number of urines to be treated, by the turning on or off of the cocks which are provided for each section of the bath. The actual distribution of steam within the bath is effected by means of perforated metal pipes which pass along the interior of each section. The perforations are so arranged that the jets of steam play between the tubes and not on to them. Reference to the figure shows that about four-fifths of the length of the test-tubes projects from below the heating element, and a cold water bath is provided to surround the greater part of this lower portion of the tubes.

(Continued from previous column.)

1917, xx., p. 457. 4. Jordan and Victorson: Journ. Infect. Diseases, 1917, xxi., p. 554. 5. Krumwiede, Kohn and Valentine: Journ. Med. Research, 1918, xxxviii., p. 89. 6. Kruse: Zeitsch. f. Hyg., 1907, lvii., p. 444. 7. Perry and Tidy: Med. Res. Committee, Special Report, No. 24, 1919. 8. Baerthlein: Centralbl. f. Bakt. Orig., 1918, lxxxi., p. 396. 9. Sobernheim and Seligmann: Deut. Med. Wochschr., 1910, p. 351. 10. Hirschfeld: THE LANCET, 1919, i., p. 296. 11. MacAdam THE LANCET, 1919, ii., p. 189. 12. Mackie and Bowen: Journ. of R.A.M.C., 1919, xxxiii., p. 154. 13. Uhlenhuth: Centralbl f. Bakt. Ref., 1909, xlii., p. 133 (Anhang). 14. Heimann: Centralb. f. Bakt., Orig., 1912, lxvi., p. 211. 15. Sobernheim: Hyg. Rundschau, 1912, xxii., p. 1026.

Consideration of the effect of the various arrangements described above shows that (*a*) the top inch or so of the contents of a tube is heated to 100° C.; (*b*) the middle portion is brought to a moderate heat; (*c*) the lowest portion remains quite cold. The advantage of these conditions is demonstrated in the case of a highly phosphatic urine, which should be treated as follows:—

A test-tube is taken from the apparatus, filled with the urine, acidified with dilute acetic acid, and replaced in the bath. Steam is now turned on for five minutes, and on removing the tube a beautifully clear and sharply defined result is obtained. The albumin, if present, is visible in the strongly heated layer of urine, even in the merest traces. The contents of the middle portion of the tube are quite clear, owing to the fact that the heating has been sufficient to clear the phosphates in acid urine, without being strong enough to bring down the albumin. The lowest portion of contents is cold and in its original condition, and serves to contrast with the heated layers.

When dealing with a large number of urines much saving of time is effected, as 40, or even many more samples can be heated in five minutes, according to the size of the apparatus. Most hospitals have a steam-supply laid on, but failing this advantage a very small boiler on a gas-ring has been found to produce all the steam required for a 40-tube apparatus. The boiler may be started in the morning by the nurse, so that when the physician arrives the apparatus is ready for use.

The method was used by me for several months in a London fever hospital, where the number of urines tested daily was large, and I believe the original experimental apparatus is still in use there.

TWO CASES OF

TRAUMATIC RUPTURE OF INTESTINES WITHOUT EXTERNAL INJURY.

BY G. E. PEPPER, L. & L.M., R.C.P. & S. IREL.

THE interesting cases reported by Mr. E. Gerald Stanley in THE LANCET of Oct. 25th lead me to record two further cases of the above injury treated by me during the war.

CASE 1.—A private in the R.A.V.C. was thrown by a restive horse, the animal falling on top of him. On admission to hospital half an hour later I found him very collapsed and complaining of great hypogastric pain. T. 96·8° F., P. 100. No dullness of abdomen on percussion, but marked rigidity. He had a hard irreducible hernia the size of a hen's egg in the left inguinal canal, but stated that it had existed for years. Catheter specimen of urine normal. One hour later he appeared worse (pulse 120), and I opened his abdomen in the middle line below the umbilicus. There was no free fluid or blood in the abdominal cavity. The hernia proved to consist of the entire great omentum, which had dragged the transverse colon down to the lower part of the abdomen, remaining attached to it by a pedicle 2 in. long. As this pedicle was severely lacerated I ligatured it and removed the mass of omentum. Four inches distal to the base of the pedicle there was a rupture of the transverse colon 1½ in. long, and this I closed with Lembert sutures. At this point of the operation the patient collapsed, and it was necessary to close the abdomen hurriedly by through-and-through sutures, one pint of normal saline, T. 100°, being poured into the abdomen. Patient rallied after the operation, but died 18 hours later. Post-mortem examination revealed a second rupture situated in the jejunum 6 in. below the duodeno-jejunal flexure.

CASE 2.—A private in the R.A.S.C., whilst exercising a restive horse, was thrown on to the pommel of his saddle, and from there fell to the ground. I saw him two hours later, and found him suffering from severe hypogastric pain, with an intense desire to micturate. There was marked dullness on percussion over the lower abdomen, and blood was obtained on passing a catheter. T. 97°, P. 100. I diagnosed intraperitoneal rupture of the bladder, and opened abdomen in middle line above the symphysis. A large quantity of blood and urine poured out, and an extensive rupture of the bladder presented; after sponging the cavity dry I closed it by two layers of catgut sutures. On examining the intestines I found two small ruptures of the ileum close to the ileocæcal valve, and closed them by purse-string sutures. The abdominal cavity was sponged dry, a large drainage-tube passed to the bottom of the pelvis, and the wound closed by layers. A catheter was tied into the urethra and was removed on the third day, the patient passing urine normally. The abdominal tube was removed on the fifth day, and the patient made an uninterrupted recovery.

These cases emphasise two points of great importance—the urgent need for early operation, and the necessity of examining the whole length of the intestines at the time of operation.

Dublin.

CASE OF

LABOUR OBSTRUCTED BY A TUMOUR.

BY THOMAS H. MORSE, F.R.C.S. ENG.

SOME years ago I published a paper[1] on the Treatment of Obstructed Labour when Caused by the Impaction of a Tumour in the Pelvis, illustrated by four cases. Since then another similar case has occurred as follows:—

CASE 5.—I was asked to see Mrs. D., who had then been in labour 48 hours, and was becoming exhausted. Pulse was 120, and pains were recurring about every three minutes. On examination per vaginam a semi-solid tumour occupied the pelvis, and with difficulty the finger could reach the presenting head, which had not yet engaged in the pelvis, but remained above the brim; the os uteri was fully dilated. The pelvis was so blocked that forceps and other instruments could not be passed into the uterus.

I decided to open the abdomen. She was at once removed in a cab to a surgical home. An incision about 11 in. long was made in the middle line of the abdomen as rapidly as possible, and the whole fundus of the uterus turned out. Mr. A. Ross, who assisted at the operation, very carefully kept it covered with hot sponge cloths. The right Fallopian tube and round ligament formed a tight cord passing behind the fundus down into the pelvis. On tracing this I found it attached to a tumour filling the hollow of the sacrum; this was about the size of a cocoanut, it was not adherent, and was easily drawn upwards and out of the wound; its pedicle was long and twisted upon itself. Having ligatured it with silk, the tumour was cut away; on examination it proved to be a dermoid ovarian cyst. The uterus was now with some difficulty replaced, as the parietes seemed insufficient to cover it; however, this was finally accomplished. The whole operation had to be rapidly performed, the pulse having reached 130 per minute before beginning. Brandy enemata were given and strychnine hypodermically, and the patient rallied quickly. The wound was dressed temporarily, and then Mr. Ross applied forceps and delivered the child, which, although well developed, was dead, the result, no doubt, of the prolonged labour. The after-treatment was quite satisfactory, and the patient was quite well in a week.

As cases of this kind will recur it will be a gratification to me to find that the method described above has become the recognised form of treatment, and that it can be easily carried out by the surgeon of the present day.

Deal.

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[1] THE LANCET, 1904, ii., 1343.

Reviews and Notices of Books.

THE GREAT WAR AND THE R.A.M.C.

By Lieutenant-Colonel F. S. BRERETON, R.A.M.C. London: Constable and Co., Ltd. 1919. Pp. 300. 12*s.* 6*d.*

IT is a truism that, for the combatant and non-combatant sections of an army, war and battle wear different aspects. The combatants face death, nerve-racking situations, hunger, weariness, and, sometimes worse than all, retreat. But against all these they have one great item on the credit side—namely, that sensation which is referred to again and again in the finest and oldest battle story in the world, the Iliad, as χάρμη, "the joy of man-ennobling battle," to quote Homer's phrase. For the non-combatants all the ills are present without this redeeming feature. Transport, ammunition columns, despatch riders, and, above all, the R.A.M.C., face every conceivable hardship and risk, while this "battle joy," when theirs, is theirs in other circumstances. It is one thing to fight when it is a question of kill or be killed, but far other to do duty with the chance of being killed, knowing that reprisal is not in the official programme. The R.A.M.C. above all others glean the sad aftermath of the harvest of war. To use homely language, they have to clean up the mess, and in the volume before us, which is the first of a series dealing with the medical work of the war, we have the record of the R.A.M.C. during the first two months of the conflict, comprising the operations around, and during the retreat from Mons, and the events of the battles of the Marne and the Aisne. The medical service was sufficient in size and equipment for the comparatively tiny army which was our first contribution to the war, except in the matter of transport; but as the army grew, an almost new medical service had to be improvised. After the first two months the auxiliary aid of the Red Cross Association and the St. John Ambulance Association had to be called in, to say nothing of the thousands of civil hospitals that were founded in private houses and municipal buildings for the care of the ever-increasing number of wounded. These matters, however, are outside the scope of the volume before us.

We have said that the medical service was deficient in transport, but Colonel Brereton is careful to point out that this was not the fault of the medical authorities. Horse transport there was in plenty, but the Director-General even before the war had foreseen the necessity for the increased mobility afforded by motor ambulances, had asked for them, and had been refused. The result of this unhappy decision became only too evident in the first hours of the war. "Seek the evidence of wounded officers and men who passed through purgatory on horsed ambulances and motor lorries. Question those unfortunate men of Mons, prisoners since 1914, wounded in the first hours of the war—abandoned for lack of transport. The dead yield no word of these doings. Yet men died for this self-same reason." Not until the operations on the Aisne were the motor-ambulances, so urgently asked for by the Director-General, supplied, and the lack of transport and its results during the great retreat from Mons are vividly described by Colonel Brereton—a retreat marked by misery and heroism only comparable to those historic retreats of the Athenians from Syracuse and the British from Astorga to Corunna, which live for ever in the narratives of Thucydides and Napier. Again and again we read of field ambulances breaking down, of wounded having to be abandoned, of ambulance horses being utterly worn out, and of the wounded having to be carried on artillery wagons and impressed civilian carts, with the result that the artillery horses also broke down, so that the guns were held up. There is more than mere sentiment in the beautiful prayer of the Russian Church in time of war: "And then for those, the humble beasts which with us bear the burden and heat of the day, we pray Thy pity, Master and Lord," for the avoidable sufferings of animals react with untold evil upon men.

Colonel Brereton's account of the heroism of all units of the R.A.M.C. is a moving tale, told with all due reserve; he mentions many names, but every man, from officer to stretcher-bearer, did his duty, and that under circumstances of inconceivable hardship, and many a one laid down his life. Nor must we omit to remember those whose deeds are enshrined in the report of the committee which investigated the typhus outbreak in the camp at Wittenberg. It will be within the recollection of all that the German Medical Staff abandoned its duties when typhus broke out, but the German Government sent six British medical officer prisoners—Major Fry, Major Priestley, Captain Sutcliffe, Captain Field, Captain Vidal, and Lieutenant (afterwards Captain) Lauder. Of these six Major Fry and Captains Sutcliffe and Field were attacked by typhus soon after their arrival and died. The other three lived to return. What they did may be read in Appendix II. of Colonel Brereton's book. As to the medical orderlies, "They, all of them, with full understanding, for they were all warned, risked their lives without a thought, and many of them died at their posts." We congratulate Colonel Brereton upon this, the first instalment of his book, which should stimulate readers to expect with eagerness the sequel.

ANESTHÉSIE À LA STOVAÏNE.

En Chirurgie et en Médecine Vétérinaires. By GUSTAVE PÉROL. Paris: Masson et Cie. 1919. Pp. 32 and plates. 3 francs.

GENERAL anæsthesia is ill-adapted to the larger animals, and M. Pérol in this little treatise shows good reason why local and regional analgesia deserve much wider recognition than they have yet received from veterinary surgeons. The risk and inconveniences inseparable from the felling of animals, necessary when no anæsthetic is employed, are all avoided, and the beast, moreover, experiencing no pain, is amenable when it comes again under treatment. A solution of 2 per cent. stovaine is recommended, and as much as 100 c.cm. may be injected into a horse without producing any general reaction. Cocaine, on the other hand, gave rise to trembling and profuse sweats. Adrenalin (1 in 1000) is used with the stovaine. Details of various common operations are printed, and a few excellent photographs of the method at work.

LE MYTHE DES SYMBIOTES.

By A. LUMIÈRE. With 47 illustrations. Paris: Masson et Cie. 1919. Pp. 209. 6 francs.

IN "Les Symbiotes" Portier proposes that all animals and plants are double symbiotic organisms, and that each of their cells contains a special microbe which plays an indispensable part in their life and metabolism. He was able to cultivate this remarkable organism from the tissues of healthy animals, and finds that it is identical with the mitochondria of cytologists and the vitamines of the bio-chemist. In the present volume, well printed and illustrated and cheap, Lumière points out, firmly and quite gently, that the available facts do not altogether support the hypothesis. It is well known that bacteria of one sort and another occasionally gain entrance to, and may be cultivated from, healthy tissues, and in an interesting review of symbiosis, cell inclusions, and vitamines, he traverses various biological problems in a readable fashion. The book closes with a graceful word of thanks to Portier for starting such an entertaining and profitable hare—thanks in which we may all join. For it is certainly proper to consider and reflect on the relations which have been established between moulds and the growth and germination of orchids and heaths, on the nature and meaning of the intracellular bacillary bodies in Blatta and Cyclostoma, on the real possibilities of a healthy aseptic existence, on the connexion between vitamines and the synthetic activities of intestinal bacteria, and generally on the due limitation of the imagination. There is a useful bibliography of 49 pages.

CHILD WELFARE.

The Teachings of Certain Dentists, School Medical Officers, Medical Officers of Health, and other Medical Men. By J. SIM WALLACE. London: Baillière, Tindall, and Cox. 1919. Pp. 102. 5s.

THE works of Dr. Sim Wallace are always interesting. His latest book is really a reprint of papers contributed to various societies and journals since 1914. In company with a few leaders of dental thought in this country, he realises that the pathology and ætiology of caries are sufficiently well known to support effective measures for the prevention of this disease, which is probably more easy to prevent than any other. And although the methods of prevention have been taught for at least the last 15 years, dental caries is still rampant in our midst. Dr. Sim Wallace believes that the onus of spreading the knowledge of how to prevent dental disease is upon all those who come into intimate relation with parents and children—i.e., medical practitioners, school medical officers, nurses, and school teachers. He has some hard words to say about those responsible for educating the medical man, and lays particular blame on the physiologists for their lack of knowledge of the elements of oral hygiene, feeling that, until these laws are understood by those responsible for the welfare of the child, progress will be slow in preventing dental disease.

The amount of dental disease amongst the individuals forming the nation lowers the health of the nation as a whole, and depreciates the economic value of the worker. There are signs that an attempt is to be made to deal with this problem by the creation of a public dental service. We draw the attention of those responsible for the creation of any service to this little book, for it will help them to recognise that the right way lies not in starting curative centres, but in the broadcast dissemination of the means of prevention. Thousands of pounds of public money may be saved in this way, and dental disease effectively combated.

AN ATLAS OF DENTAL EXTRACTIONS.

With Notes on the Causes and Relief of Dental Pain. By C. EDWARD WALLIS. Second edition, with 11 plates. London: J. and A. Churchill. 1919. Pp. 23. 5s.

THE author has designed this small work for the use of medical students and practitioners, and he has, we think, succeeded in producing a very useful book. The medical man who is called upon, in an emergency, to extract a tooth has not at hand a modern dental operating chair, and has therefore to make shift with an ordinary arm-chair. The author, having realised this, has shown how the operation of tooth extraction can be carried out in an "improvised dental chair." The technique of the methods of removing the different teeth is clearly and concisely stated, and should prove of great practical value. We think that the book will reach another edition, and we would therefore suggest to the author, when he is revising his work, to describe more fully the method of plugging sockets in cases of bleeding, and also to make quite clear that the bleeding is not always from the tooth socket, but sometimes from torn vessels in the gums. We would also point out that calcium lactate is more efficient when freshly prepared.

THE PHYSICAL CHEMISTRY OF THE PROTEINS.

By T. BRAILSFORD ROBERTSON, Ph.D., D.Sc. London: Longmans, Green, and Co. 1918. Pp. 484. 25s.

THE protein group has received intensive study during the last decade with results of increasing interest and importance. The situation as it stands is admirably presented in this volume and it is doubtful whether a more complete or up-to-date account exists, the author having taken extraordinary pains to exhaust past and current literature on the subject. Proof of this is seen in the references to such an important investigation as that of Van Slyke, who developed an accurate and simple method of determining free amino groups; to the work of Pauli upon the combining capacity of de-aminised proteins; to that of Schmidt and B. af. Ugglus upon compound proteins; of Procter upon the swelling of protein jellies; of Reichert and Brown upon the crystallography of hæmoglobin, and of Dabrovsky upon the molecular volumes of proteins dissolved in water and in solutions of coagulating salts. The book is a valuable and welcome contribution to the subject.

AIDS TO THE MATHEMATICS OF HYGIENE.

By R. BRUCE FERGUSON, M.A., M.D., B.C. Cantab., D.P.H. Eng. London: Baillière, Tindall, and Cox. 1919. Pp. 186. 3s. 6d.

THE fifth edition of this valuable little pocket-book is even better than the previous editions, the most notable new points being an explanation of the term millibar which is now so frequently used in barometrical records, and an important addition to the chapter on Energy, Exercise, and Diet. Questions that have been set in the various D.P.H. examinations are given on each subject: most of them have been worked out in full, and are so clearly and simply expressed that the most unmathematical reader can easily understand them. The following is one example: How much sewage would be discharged in three hours by a sewer, circular in shape, with a diameter of 18 in. and a fall of 1 in 180, running half-full? The amount is shown to be 2,565,427 gallons. The chapters on the construction of a hospital ward and on vital statistics are especially noteworthy. It is not merely a book for students, but is a reliable book of reference that might well be on the table of every public officer of health.

OPERATIONS ON HUMAN CORPSE AND LIVING DOG.

Operationsübungen an der menschlichen Leiche und am Hund. Von Professor Dr. G. AXHAUSEN. With 132 plates. München: J. F. Lehmann. 1919. Pp. xii + 308. 50 marks.

THIS work is not a text-book in the ordinary sense, but is rather a series of "exercises" in academic operative surgery, and it gives us throughout an impression of being divorced from reality. It contains descriptions of a series of operations on the dead human body and on the living dog, and an industrious German student, having worked conscientiously through it, would no doubt imagine that he was well equipped to face the exacting demands of the operating theatre. But he would be mistaken. It is a book with large pretensions; the descriptions of operations are clear; but the author's omissions are, to an English reader, remarkable and some of the methods described still more so. Certain examples may be given. In the section on amputations we have very full descriptions of the operation of amputation of the foot according to Chopart and Lisfranc, but Syme's operation, which, by English surgeons at any rate, is preferred to any other, is not even mentioned. It is difficult to believe that the author's choice really represents the result of German experience. In the section on cranial surgery the ordinary operation of trephining is not described; the author concentrates on the fashioning of an osteoplastic flap, but gives the impression that the only method of opening the skull which is known to him is effected by means of the chisel and mallet, the more refined methods of modern surgery not being mentioned. In describing the operation of appendicectomy the author refers to the pararectal incision, but dismisses it as inferior to the "outer incision." He then describes this very fully, and remarks that the muscles may be divided in the line of their fibres, but he evidently regards this as an unnecessary precaution, for all his very careful drawings of the stages of the operation show the muscles ruthlessly divided in the line of the skin incision.

That part of the book which is devoted to operations on the dog points to a difference in national systems of education. The German student is able to familiarise himself with the technique of abdominal surgery by practising on the dog; in this country such work is only done by experts and for cause shown.

An immense amount of trouble and expense has been devoted by the author and the publishers to the illustrations, which are extremely good. The numerous coloured plates are masterpieces of colour printing, a process in which Germany has long excelled.

THE LANCET.

LONDON: SATURDAY, JANUARY 10, 1920.

Rewards for Medical Discovery.

WE publish in another column a report which is to be presented to Government at an early date by a Joint Committee of the British Medical Association and the British Science Guild, the object being to ensure that medical discovery shall be more adequately rewarded by the State than it is at present. The Joint Committee, it will be seen, has a strong personnel, and the document sets out their considered point of view in clear terms. Medical discovery is defined, under two heads, as being (1) the ascertaining of new facts or theorems bearing on the human body in health, and the nature, prevention, cure, or mitigation of injuries and diseases of human beings; and (2) the invention of new methods or instruments for the improvement of sanitary, medical, and surgical practice, or of scientific and pathological work. With these definitions no one can quarrel, but it will occur immediately to all minds that considerable discussion may arise over the word "new." Medical science is essentially evolutionary, the departures of the present being alike founded on the knowledge of the past and directed towards the developments of the future. At almost every point in the history of a medical discovery part of the work is old while part of it is new. A great proportion of medical investigation is necessarily engaged at first on the testing and perfecting of the old; at what point does the work become "new," and therefore eligible for an award under the definitions of the Joint Committee?

The reasons for rewarding medical discovery are set out as twofold—to encourage medical investigation, and to discharge a moral obligation incurred by the public for its use of private effort. In the first of these reasons we find some answer to the difficulty we have set up. It is to encourage medical investigation that money is required, so that rewards for the results of discovery may, partly at least, be received while the inventor is engaged at his work. The more this situation is encouraged, the further into the background recedes the need for pensions. Undoubtedly at the present moment the scientific investigator, as far as the profession of medicine is concerned, is quite unfairly rewarded. Apart from titular honours and dignities, he can have little to look for except small professorial or tutorial fees, or some inadequate return for his educational work; while alike as professor, demonstrator, or lecturer he spends a large part of his time aloof from any commercial contact with the public. Most of our educational leaders have been persistently underpaid for that part of their work; now that we all see in properly directed research the great future of medicine, it follows that those who direct should be properly remunerated. From their work will come the discoveries that mean immeasurable benefit to the State.

The Report divides medical discoveries into those which have cost the investigator direct or indirect monetary sacrifice, those which have brought return to him by an increase of professional emolument, and those which involve neither gain nor loss to him, the last class being the largest. It is clearly unjust that medical discovery which may be of extreme value to the public should entail financial loss upon him who has made it, and where this is the case compensation should be forthcoming, though the determination of the actual figure will often be a delicate task. The Report suggests that the following four things should be taken into account: Width of application, difficulty of work done, immediate practical utility, and scientific importance; and under the last three of these four headings a properly selected body of almoners should have no difficulty into coming to just decisions. But when such a body of almoners come to consider width of application of a medical discovery they will at once be faced with the difficulty which we have foreshadowed above, and the Report reveals this, although not in so many words, when it says that the work of many of the older anatomists, physiologists, and parasitologists, of PASTEUR, and of investigators of immunity, has affected most recent discovery. The wider the good effected by the departure the more difficult will it be to decide if it is "new." We have purposely set out some of the difficulties before the Joint Committee in making out the case; it only remains to say that we are wholly with the spirit and objects of the representation.

The Outlook in Psychotherapy.

"IN the world there is nothing great but Man; in Man there is nothing great but Mind"—the words of Sir WILLIAM HAMILTON are engraved in letters of gold on the walls of his old classroom in the old University of Edinburgh. Is the day at length dawning that is to see full recognition of their truth, and is the medical profession to play a leading part when Mind comes to claim its kingdom, or shall it be content to follow where others lead? He who reads the signs of the times is aware of a surging movement towards the doors beyond which opens the world of the psyche, an insistent stretching out for the key to unlock its mysteries. No material explanation of the simplest phenomenon satisfies the man for whom modern journalism caters: CARPENTIER prevails, because of the glamour of hypnotism; untutored ladies know not what they paint, but lo, on reversing the picture, it is seen to have become, through "spirit guidance" and by "psychic power," a head of the CHRIST. What though the smile of superior knowledge curl on the lips of the sceptic?

What though the persons concerned can ridicule the pretensions to mysterious influence with which they have been credited? Has not the average man heard on every side of communication with those who are gone, of visions on the eve of battle, of the angels of Mons and the Poltergeists of Sir ARTHUR CONAN DOYLE?

Let those of us, however, who are indifferent to such examples of the will to believe, bethink themselves how closely they are concerned in the equally insistent trend towards mental healing. No consultant but learns how patients drift off to some irregular practitioner with electricity in his fingertips, no sufferer but has heard of the cures, invariably marvellous, effected by some who are outside the pale, and of whom it is alleged we are jealous. Yet why should we be? The proper and rational application of psychotherapy in suitable cases is being successfully conducted by scores, nay hundreds, among us, who have their grateful patients just as much as any Eddyite, faith-healer, or "new-thought" expert. If we ask why it is that such self-constituted therapists flourish in our midst, the answer is obvious. In the first place, a proportion of the medical profession still looks askance at anything savouring to them of the mysterious or the unknown; for them hypnotism suggests mesmerism and disgusting public performances of other days, not free of a considerable admixture of the fraudulent; Freudian psycho-analysis means a nasty mind, wallowing in sexual garbage to the detriment of practitioner and patient alike; suggestion implies the merest trifling with a symptom, to the exclusion of any genuine effort to find a cause. The prejudices of these our confrères, be it said plainly, are based on simple ignorance of the facts. And this leads to the second point, which is that no schools of rational psychotherapy have ever been established for the instruction of the student of medicine, undergraduate or post-graduate; as he is laboriously taught how to stain a section of a fatty liver but not how to prevent the liver from becoming fatty, so the complete paranoiac is paraded before him in the institution, but no systematic initiation into the prevention, recognition, and cure of the earliest stages of the mind diseased is ever attempted. When have we had in this country a school of psychotherapy with the reputation of the schools of Nancy and the Salpêtrière, faded though it now may be? Why are the great names in psychotherapy monotonously foreign? The student picks up a few crumbs in a haphazard fashion, but how many of us, by the day we received our diplomas and were licensed to practise medicine, had actually seen cases of functional nervous or mental disease treated and cured by an expert in the subject? It is little wonder, then, that a valuable paper such as that published by Dr. W. A. POTTS, on Psychotherapy in Ordinary Practice, in a recent number of THE LANCET,[1] should seem to not a few a departure, opening a new field of the existence of which they have been in regrettable ignorance. It is no answer that treatment by psychotherapy is as old as the hills, and the ancient platitude that physicians employ suggestion habitually, if perhaps unintentionally and unconsciously, no longer suffices. Until the approved methods receive recognition in the medical schools, and the application of theoretical knowledge to concrete cases is there displayed, so long will dissatisfied patients flock to those who may, indeed, be unacquainted with the morbid anatomy of general paralysis, and have never heard of schizophrenia, but who can remove a psychic neuralgia or give the weary sufferer sleep. There is no reason in the world why the same proportion of our young graduates should not turn their steps in the direction of psychotherapy as at present are attracted by any of the specialties.

It has ever been the boast of the profession that they have tried to elevate mankind to their own standard of scientific knowledge, and that improvements in the mental and physical hygiene of the race have been preceded by the discoveries of medicine. We must see to it that we lag not behind in our application of psychological methods to psychological disease or to functional symptoms in organic disease. Undeterred by the indifference of some in the high places of medicine, and equally uninfluenced by the exaggerated claims of the extremists and the absurdity of their attitude, we should seek to ensure that the new generation in medicine will at least have the chance of learning its psychotherapy under happier auspices, and in a different atmosphere than in the days that are passed.

[1] THE LANCET, 1919, ii., 1123.

War Nephritis.

THE problems of military medicine are always changing. When one disease has been apparently scotched, another raises its head. Typhoid and dysentery were reduced to comparative impotence in this war, though veritable scourges in the South African war. Malaria has proved a more serious matter, while nephritis, so rare in warfare, assumed an epidemic form—so far as we know, only for the second time. Among the Allies it appeared first in Flanders among the British in March, 1915, but did not affect the French until July of the same year. Less common among the Belgians than either the French or the British, it was infrequent in the Italian army. The Germans first recognised it in the troops on the swamps at the Eastern front. It would be of great interest to know whether it appeared there earlier than on their Western front, in view of the suggested infective origin. It might be held that it is unlikely that an epidemic would start at two widely separate points, but, remembering the free transference of troops between East and West practised by the Germans, this argument can carry little weight, especially as it was the British observations which first called attention to the existence of the disease on the Western front. It is noteworthy

that on both fronts it first appeared in swampy or flooded territory. Our authorities, with the coöperation of the Medical Research Committee, lost no time in investigating the disease. Wards were set aside for its observation at St. Bartholomew's Hospital, and a preliminary report was issued in the *Journal of the Royal Army Medical Corps* for July, 1915, by Dr. LANGDON BROWN. Both in France and in this country many observations were made, and in 1917 the Committee provided the services of Dr. HUGH MACLEAN, who designed and carried out in France an investigation of a far-reaching character. Captain DE WESSELOW and Captain J. A. WILSON were associated with this work and reports appeared from time to time. A final report has now been issued by Dr. MACLEAN in a convenient form, which embodies not only his own able and laborious research, but also a generous acknowledgment of the work of others.

That war nephritis could be due to military training seems, a priori, unlikely, since it has been an unusual accompaniment of wars in the past, and it occurred early in this war before the less fit population was drawn upon. But it is not sufficient to rely on a priori considerations, and it is well that Dr. MACLEAN has taken the opportunity to investigate this point fully, since it helps to throw light on the ætiology of nephritis in general. He examined 50,000 men who had practically completed their training, and found that not more than 2 per cent. gave any definite indication of kidney disease as indicated by the presence of albuminuria and a fairly large number of casts. Other definite signs of renal disease were found in about 1 per cent. The albuminuria produced by sudden severe exertion passes off on resting, and does not become any more marked with prolonged training. Nor does the incidence of albuminuria and casts tend to increase with length of service; it is, indeed, commoner in the younger soldiers from 18 to 20 or so. No relationship could be made out between albuminuria and previous occupation in civil life. The subsequent history of these 50,000 men is instructive. Only 161 were returned as possibly suffering from nephritis, and of these only 28 had shown albuminuria before going into the trenches. It is curious to note that the disease generally attacks its victims fairly quickly after their arrival in the trenches, for of these 161 49 became ill within two months, while within four months 106 cases had developed. This suggests that there may be some special liability in those affected, but the influence of training for active service can be eliminated as a factor in that liability; nor is pre-existing albuminuria responsible, since the majority of the men who contracted the disease were known to be free from albuminuria a short time before.

Reviewing the ætiology, MACLEAN agrees with LANGDON BROWN and others that exposure, water-supply, diet, alcohol, metallic poisons, and previous illnesses cannot be held responsible, and concludes that war nephritis is probably due to some special infective agent. But he shows that once the disease was established in the army there was a definite seasonal variation, the curve of incidence showing an inverse relationship to that of the temperature. But he holds that cold and exposure do not initiate the mischief, though they no doubt often aggravate it. There is evidence that slight but undoubted symptoms of nephritis, developing during the summer but not necessitating admission to hospital, may recur during the winter months in a severer form, and then for the first time figure in the statistics. That war nephritis is due to an infection cannot be regarded as definitely proved, since the various claims to have isolated the infective agent have never been confirmed. But if it were dependent on any circumstance connected with the war other than infection, it would almost certainly give a higher incidence in those with inadequate kidneys, which is not the case. It is interesting to note that a unit with a high incidence of nephritis at the front continued to show it for some time when at rest, which would indicate that when the infection is once established it persists apart from locality. Colonel A. B. SOLTAU found that when troops were stationed in certain localities which appeared to be more infected they developed a high rate of nephritis in course of time. MACLEAN adduces evidence suggesting the conveyance of the infection by means of body vermin—probably lice—and is of opinion that if this assumption is granted all the anomalies and difficulties in connexion with the ætiology of the disease disappear. That it is an epidemic infection associated with prolonged occupation of trenches is further suggested, as pointed out by LANGDON BROWN, by the conditions under which it appeared in the American Civil War, the only previous war in which nephritis occurred in an epidemic form. That the infective agent is a filter passer is probable but not proven. The very uniformity of the clinical symptoms may be taken as further suggesting a common infective origin. Later observers have added very little to the early descriptions. Dyspnœa, which is such an important symptom in war nephritis, remains its only special peculiarity, and is possibly due to the local lesions in the lung described by DUNN and MCNEE. The morbid anatomy may be summed up as an acute lesion in the form of blocking of the capillaries of the glomeruli and less marked changes in the epithelium of convoluted tubules of the kidney, accompanied by desquamation of epithelium in the bronchioles and pulmonary alveoli, with fibrinous deposits on the denuded surfaces.

It is noticeable that hydræmia was present in the majority of cases, and appeared to be closely connected with the rise of blood pressure. Cardiac enlargement chiefly occurred in those patients who had struggled on for some time before admission to a field ambulance, and was usually of a temporary character. Urea retention occurred in the earlier stages of moderately severe cases, but, as soon as the kidney lesion improved to some extent, this

retained urea exerted its diuretic action with the result that marked polyuria occurred. There is a distinction between an azotæmic form showing little œdema, with the output of diastase and urea diminished, while that of the chlorides is normal, and a hydræmic form with œdema, normal output of diastase and urea, but that of chlorides much reduced. In the former type MACLEAN advises a low protein diet until nitrogenous retention disappears. In the latter he only restricts protein diet in the acute stages, but cuts off salt. He agrees with most other observers that stimulating diuretics are valueless; nor has he much to say about the benefit of any other drugs. Venesection for convulsions, hot-air baths and purgation for œdema, and gradual exercises in convalescence, all meet with his approval. The immediate mortality throughout was low—probably about 2 per cent. Dr. S. C. DYKE found complete recovery in 60 per cent., while in 40 per cent. the re-establishment of renal function was incomplete.

So far this report summarises in convenient form observations which in the main have already been published. But in addition four tests for renal efficiency are described. Three of these had been previously employed—the estimation of the urea in blood by Van Slyke's method, the estimation of urinary chlorides, and the estimation of urinary diastase introduced by WOLGEMUTH which was applied to the earlier cases in this epidemic by MACKENZIE WALLIS with marked success in determining prognosis. But the remaining one is new and simple, and may prove of value in ordinary nephritis. Fifteen grammes of urea are dissolved in 100 c.cm. of water, and the mixture flavoured with a few drops of tincture of orange. The patient empties his bladder and then drinks the solution. He empties it again one and two hours later, and the percentage of urea in these specimens is estimated by the hypobromite method. A concentration of 2 per cent. or more in the first specimen may be taken as evidence of an efficient kidney, rendering examination of the second unnecessary. A moderately efficient kidney may show a concentration of 1·5 per cent., while 1 per cent. or less means that the kidney is seriously damaged. It is claimed for this test that it has been of great value in assessing the degree of disability produced by war nephritis. The part played by Sir WALTER FLETCHER, the secretary of the Medical Research Committee, has been very valuable; his initiative and persistent interest in the subject have made this important series of observations possible.

MONYHULL COLONY FOR EPILEPTICS AND THE FEEBLE-MINDED.—Monyhull was during the war an important section of the 1st Southern General Hospital, which had taken over large buildings recently erected. These buildings will now revert to their proper use for epileptic and feeble-minded children, and form an addition to the older colony for adults. The committee have wisely expressed the view that great opportunities will be provided for investigation, and have decided to make arrangements for medical research. The colony will be the largest establishment of its kind in the country.

Annotations.

"Ne quid nimis."

SCIENCE AND INDUSTRY.

UNDER the stress of war, especially in the last two years, time-honoured prejudices yielded to a fuller and freer discussion of essential aims. As a result of this salutary process many kinds of industry came into more intimate touch with scientific research, which in its turn found new objectives of great interest. Science, in fact, began to rejoice in its heritage of vivifying and explaining the common things of life. Of the institutions in this country which contributed to this desirable result none earned a higher place than the Imperial College of Science and Technology at South Kensington. Enjoined by its Charter to train students in science, with special relation to the needs of industry, this college, on the recommendation of the Haldane Commission on University Education in London, became a constituent unit of London University in the faculty of science. In the final report of the Commission it was stated, in contrast with other foundations, that the Imperial College was so well equipped and so efficiently staffed that no further provision was held necessary in order to qualify it for inclusion as a constituent college of the University. At the same time the Royal Commission expressed a difficulty in regard to a faculty of technology. "It would be unfortunate," the report runs, "if the teaching of pure science were altogether removed from the college. It would be detrimental to the students by narrowing the range of intellectual interests represented among them, and equally detrimental to the technological teachers whose work is based upon the principles of pure science and who find in the investigations of the pure scientist the support and suggestions which lead to fresh applications of a practical kind." The hope was expressed in the report that the Committee for Technology should not organise their departments in a way detrimental to the faculty of science as a whole. The misgivings of the Commission do not seem, however, to have been realised quite in the way expected, for in a letter to the *Times* of Dec. 31st, over the signatures of 22 members of the professorial staff of the Imperial College, it is asserted that the college has, from its foundation, endeavoured to carry out the injunction to train students in science with special relation to the needs of industry, not by sacrificing the methods of science but by adapting them to specialised needs. The signatories, who number among them 13 Fellows of the Royal Society, claim that there is room both for the more academic and the more utilitarian aspects of science, and admit no fundamental deviation in principle involved in training with industrial needs in view. The brief period of association with the University of London has been felt by the college staff, not as a stimulus to scientific work, but as a drag upon the best prospects of development, and this feeling took the form of a deputation to Mr. Balfour and Mr. H. A. L. Fisher on Dec. 15th, when the case for the granting of its own degrees by the Imperial College was ably set forth by Professor W. W. Watts and others. The force and cogency of their arguments cannot be resisted, and upon them they build a plea that their specialised and independent curricula should lead to degrees

granted on their own responsibility alone. The final science examinations of the University of London are different in plan and in character, with the result that second-rate students of the Imperial College may obtain first-rate degrees and vice versa. The needs of industry are so pressing, and its scientific development is changing so rapidly from year to year, and almost from month to month, that flexibility must be regarded as an essential part of any union of science and industry. Professor M. J. M. Hill, in a reply to the joint letter published in the *Times* of Jan. 3rd, states that public opinion is not yet ripe for dispensing with external examiners in science degrees, or, as another writer has put it, "branding your own herrings." Professor Hill suggests a modification of the statute allowing the examiners for the degree to consist of the student's teacher and an external examiner, plus a referee to act only in the event of a difference of opinion arising between the other two. It is doubtful whether such a liberal concession as this will now content the professorial staff of the Imperial College. They have a vision of science in relation to industry not less noble than the academic science of the last generation, and we have little doubt that they will attain their object. If they do so it may set the precedent for the disruption of the University, as Professor W. H. Bragg and Professor E. H. Starling plead for a similar release of University College and King's College from what they have in practice found to be a deterrent influence. Dr. H. E. Armstrong, in another contribution to this correspondence, would grant autonomy to each college, encouraging each to assume special features: the Imperial College as a centre for physical science and engineering, University College as a centre for biological science, King's College as a centre for arts. As this would mean that certain faculties might be unrepresented in a particular University strong resistance can be anticipated.

VACCINATION AND THE WAR.

IN the Swiss medical journal *Correspondenz-Blatt* of Dec. 4th, 1919, Professor G. Sobernheim, of Bern, contributes some observations on the behaviour of small-pox and vaccination among the Central Powers during the war, with special reference to precautions which may be requisite to keep small-pox out of Switzerland. Vaccination was again on its trial, the occasion was unique, and there was an experiment on the grandest scale. Once again the protective value of vaccination was proved beyond all shadow of doubt. It is chiefly as a source of illustrations of this thesis that Professor Sobernheim's ten pages of observations are of value. The German military machine had suffered from small-pox in 1870–71. Accordingly universal compulsory vaccination was installed in 1874 as a military measure. The testing time arrived, and the wisdom of the vaccination policy was abundantly vindicated. Dr. Sobernheim makes the interesting observation, for instance, that small-pox among the civil population in Berlin was a disease of older persons, in whom vaccination had partly worn out; in 1917 80 per cent. of the small-pox cases in Berlin were over 40 years of age. The younger people, in whom vaccination was recent, scarcely suffered at all from the disease. Another striking fact was the behaviour of small-pox among the various classes of Poles. Among many of the Jewish population hygiene was of a low standard; their houses were poor and insanitary; the inhabitants were dirty; typhoid and other infections were prevalent, with the exception of small-pox, which had a strikingly small incidence. Among other classes of Poles who were cleaner, more hygienic, and better circumstanced in sanitation generally, small-pox had a very heavy incidence. On a review of all the factors and circumstances which could bear on this remarkable difference in the incidence of small-pox, there was to be found only one explanation which could account for the phenomena—namely, the fact that the Jewish population was well vaccinated, the others were not. It was evidently a case of survival of the fittest, and the Jews, knowing how to look after themselves, survived.

As regards the incidence of infectious disease among the soldiers, the same events which occurred among British troops are related by Dr. Sobernheim to have occurred among the German troops—that is to say, it was recognised that individual hygiene was impossible; men could not possibly escape infection as they could in civil life, nor could cases of small-pox be isolated as they occurred. Therefore the only available expedient was to immunise the individual in order to make him efficient. This was done by revaccination on the soldiers joining up, and also, where necessary, in the camp and field. Vaccination of the civil population was less efficient. The result was seen in 1915, for instance. In that year small-pox attained such proportions in Austria that the deaths from it were 23,500 (giving a case-incidence of at least 100,000). But the disease did not spread in Germany. There was hardly more small-pox there than in peace-time. Dr. Sobernheim's paper also refers to the usual objections to vaccinations; he appreciates the protection enjoyed by Switzerland owing to the efficiency of vaccination in Germany; nevertheless he has important recommendations for Switzerland, which are well worth the notice of legislators here. Notes are added about the method of spread of infection, and about recent research into the nature of small-pox infection. Altogether a notable epidemiological contribution, if only for its appreciation of a fact imperfectly understood on this side of the Channel—namely, how much the work of army medical officers protected the civil population at home.

REFORM IN THE LAW OF DEATH CERTIFICATION.

RECENTLY in the House of Commons Mr. John Davison asked the Minister of Health whether, in connexion with his consideration of intended reforms in the present law of death certification, he would take note of the desirability of providing that no medical practitioner should certify a death without having first inspected the body, and that all deaths occurring suddenly after operations or vaccination or inoculation or drug injections should be reported to the coroner by the medical practitioner in attendance. To this question Dr. Addison replied that the points referred to should be considered. Doubtless, Mr. Davison meant more than his question implied. We are not aware that medical men do "certify *deaths*" without first inspecting the body; it is certainly not desirable that they should. On the other hand, that no medical man should certify as to the *cause* of death of a person under his care, whose death is reported to

him, without satisfying himself by inspection that death has occurred, is quite another matter. At present, of course, a doctor is prohibited by statute from making any charge in respect of a certificate of the cause of death; but, if the State desires to cast further statutory duty and responsibility upon medical men, the discharge of such duty and responsibility will not be acceptable—we must speak frankly—unless the State provides for just remuneration, in certain cases at least, and removes the present proscription of fees from persons who are in a position to pay them.

The second portion of the question asked by the honourable Member for Smethwick contains a suggestion which, if carried into effect, would entail consequences that can hardly be foreseen by him. We do not envy the draftsman called to define the terms "suddenly" and "after," in this connexion, and if, as would appear probable, it is the desire of the honourable Member to impose some form of check on the professional treatment of persons undergoing it, we do not see why he does not suggest that *all* deaths occurring suddenly after treatment of any kind by a qualified medical man should be reported to the coroner, just as all sudden deaths occurring without treatment are now so reported. True, we should require many more coroners and should have many more inquests. But, in all seriousness, is it not obvious, if special surgical and medical procedures, when followed by the death that they have perhaps been undertaken to avert or postpone, are to involve, if not in every case a formal inquest, at least a coroner's officer's inquiry, that the public generally will be averse from sanctioning these procedures, and that doctors will hesitate to act without express sanction? We do not fear that any hasty or ill-considered legislative efforts will be initiated by the present Minister of Health; but there seems need for the public to be instructed, and, in the absence of such instruction, unwise or even foolish public demands are apt to become so insistent that ultimately "something" is "done" that would better have been left undone.

CAROTINÆMIA.

UNDER this title Dr. A. F. Hess and Dr. V. C. Myers,[1] of New York, describe a systemic pigmentation caused by the introduction of an excess of carotin in the food. The colouration is not confined to the face, but involves to a less extent the entire body, being most evident on the palms of the hands, which show also distinct signs of desquamation. The sclerotics are not at all affected. The urine is amber, and the stools are normally yellow. The two children in whom this new clinical picture was observed were receiving a daily ration of carrots in addition to new milk and cereal. On omission of the carrots from the diet the skin gradually lost its yellow colour, and in the course of some weeks regained its normal tint. The discolouration of the skin was accompanied by a similar yellow tinging of the blood serum and the plasma, the pigment in the blood being identified as carotin. As this substance is a constituent of almost all vegetable foods, the writers are of opinion that carotinæmia is not a rare occurrence, but has probably been frequently overlooked, confused with mild grades of icterus, or attributed to some obscure metabolic disturbance. They found that when carotin was injected subcutaneously, or given by mouth, the pigment appeared rapidly in the urine. This occurrence is of interest in view of the fact that there is a general tendency to regard urinary pigments as formed solely from bile or its derivatives.

[1] Journal of the American Medical Association, Dec. 6th, 1919.

THE VENTILATION OF SUBMARINES.

BOTH aeroplanes and submarines have introduced new physico-medical problems, or rather they have made of old physical problems matters of great medical importance at the present time. Two or three articles have appeared during the last 18 months in the French medical press on submarine hygiene, the most recent being a contribution by Dr. L. Brodier in the *Paris Médical* for Dec. 20th, 1919. The French submarines vary considerably in size, but an average air capacity appears to be about 400 cubic metres, which allows roughly 12 cubic metres per man. On a smooth sea, when the submarine is riding on the surface, a moderately efficient ventilation is afforded by the port-holes, but should the sea be at all choppy these openings must all be closed and an auxiliary system of ventilation becomes necessary. The American vessels have a ventilation pipe accompanying the periscope. The French submersibles are fitted with two "air sleeves." Fresh air is sucked through one and foul air expelled through the other by means of electric fans. When the boat is submerged new problems arise. Communication with the atmosphere is excluded. In addition, hydrogen evolved from the accumulators cannot be carried away, and as its proportion in the atmosphere rises the danger of explosion is increased—8 to 10 per cent. will be detonated by a spark from the motors. Other gases more directly poisonous are also contributed by the electric apparatus, as when sea-water coming into contact with a current is electrolysed, with the formation of chlorine. To complete the medley of evil odours it is only necessary to remember that all life must be carried on in this confined space. It is comforting to learn that, according to the researches of Kress, there are fewer bacteria present in this mixed atmosphere under water than when the boat is fully ventilated on the surface. The replenishment of oxygen is found to be one of the least of the difficulties to be overcome; 16 per cent is held to be the lower limit for oxygen content of the air. In the *Daphné* (380 cubic metres for a crew of 33 men) the oxygen content was found to be still 17 per cent. after a dive of 16 hours without oxygen replenishment. The elimination of carbon dioxide and poisonous gases is a more serious difficulty. In the experiment just quoted the *Daphné's* CO_2 content was found to have risen to 1·6 per cent. in six hours only, the limit being considered as 3 per cent. Many of the methods used for purifying the atmosphere are still kept secret by the various powers, but one or two are disclosed in Dr. Brodier's paper, the German and Italian methods being described in some detail. The principal in each case is to pass the vitiated air over some chemical mixture which will absorb the impurities. Arsenuretted hydrogen is a special danger. The English accumulators are made of selected metal from which every trace of arsenic has been eliminated. In addition, each chamber is adorned with paper treated with bichloride of mercury to detect traces of this dangerous gas in the atmosphere. The French meet the danger by including potassium permanganate amongst the chemicals over which the impure air is passed. The danger

of fire from explosion would appear to be ever present, and, in the German submarines at least, fire extinguishers are furnished in every compartment.

OLD-AGE PENSIONS IN 1920.

THE increased price of the necessaries of life rendered imperative some increase in old-age pensions, which were originally fixed by an Act of Parliament passed in 1908, and the opportunity has been taken to introduce a few administrative improvements to a measure already amended in 1911. In the financial circumstances produced by the war it could hardly be expected that an augmentation would be granted upon a scale that would substantially improve the situation of pensioners as compared with that prevailing before August, 1914, but the maximum pension is now doubled, and allowance is made for the diminished purchasing power of any income already enjoyed by the recipient, the improved pension taking the place of the weekly 2*s*. 6*d*. recently given as an additional allowance. Under the old scheme the full weekly pension of 5*s*. was given where the yearly means of the pensioner did not exceed £21, and no pension was allowed where they exceeded £31 10*s*. Under the new scheme a sum of 10*s*. is allowed where the existing means do not exceed £26 5*s*., and the claim to a pension on a sliding scale exists up to the point where there is an independent income exceeding £49 17*s*. 6*d*. The sliding scale for those having incomes between the lowest and highest above mentioned is proportionate, the amounts being between £26 5*s*. and £31 10*s*., eight shillings per week; £31 10*s*.–£36 15*s*., six shillings; £36 15*s*.–£42, four shillings; £42–£47 5*s*., two shillings; and £47 5*s*.–£49 17*s*. 6*d*., one shilling. The disqualifications attaching to the receipt of poor relief are reduced, and are stated in a circular issued by the Ministry of Health, the department now responsible, to explain these and various other changes effected by the Act of 1919, now in force.

"A person will not in future be disqualified for receiving or continuing to receive an old-age pension by reason of the receipt of outdoor relief. A person who has become an inmate of any workhouse or other Poor-law institution will be disqualified for receiving, or continuing to receive, a pension while he is an inmate, subject, however, to the proviso that a person who enters a Poor-law institution for the purpose of obtaining medical or surgical treatment, will not, during a period of three months, if he so long continues to require such treatment, be disqualified on the ground only that he is an inmate of a Poor-law institution."

It must certainly be admitted that the Acts of 1911 and 1919 have considerably improved the original law under which a claimant was once refused a pension who had been an inmate of an infirmary, and had been removed from it to the workouse at the request of the doctor under whose care she was, in order to make room for urgent cases, and who, after being treated at the workhouse for seven or eight weeks, was discharged cured. Another claimant, when the Act of 1908 came into force, was refused a pension because while he was in a hospital in December, 1908, his wife had had to obtain outdoor relief! Mr. H. J. Hoare, in his small book on Old Age Pensions,[1] from which we have taken the above examples, proposed the refusal of pensions to persons so dirty and verminous as to suggest their inability to exist with reasonable decency upon the pension. The sum allowed is still so small that old people not able to obtain any addition to it will hardly be able to support themselves, but apparently they are still to be left to select for themselves the moment when they will give up the unequal struggle against penury and its results. Mr. Hoare in 1915 could find few recommendations to make for bettering the existing Acts, and having considerable experience of their administration in the neighbourhood of London was of the opinion that they worked smoothly and well. The recent amendments are indeed not likely to be improved upon until the Treasury finds itself able to sanction a considerable increase in expenditure, a consummation not likely to be realised for some time. It is possible, however, to hope for, rather than to predict, an automatic amelioration of the lot of the old-age pensioner through an eventual fall in some, at least, of the prevailing prices.

[1] THE LANCET, 1916, i., 84.

JUVENILE EMPLOYMENT.[1]

THE period covered by this report was, perhaps, the most critical one of the war, when the problem was rather the extent to which all workers could contribute to the national effort than the way in which industrial conditions could be modified to benefit the juvenile worker. Whilst the demand for boy and girl labour was greater than in normal times, the openings offered were inferior; the employment available, notably munition work and clerical work in Government departments, did not offer any training for the future. The use of schools as hospitals necessitated the occupation of other school buildings by two schools, so that the children could only be accommodated half of each day, with the result that many of the children filled in the other half with employment. The system of testing applicants for certain employments plainly showed that the school leaver from a half-time school was inferior in ability and general intelligence to children who had been attending a full-time school. Now that the bad times are over the Cardiff Education Committee hope that much can be accomplished in the training of juveniles for crafts and occupations by taking individual trades or groups of kindred trades and thoroughly overhauling the system, standardising wages and conditions, and making apprenticeships more attractive as compared with casual and cul-de-sac employments. The children from the poorer parts of the city display an amazing lack of knowledge of anything outside their own restricted district. To remedy this defect in a measure arrangements have been entered into with a number of employers for small parties of senior pupils to be conducted round works and factories. Apart from the question of employment, the educational value of such visits is considerable.

The neglected boy who spends most of his leisure time in the streets constitutes a special problem. Two of the care committees of the district have been able to organise boys' clubs, which have proved successful in dealing with this class of boy. In connexion with the larger club it is proposed to organise a working boys' home, especially for boys who have come to Cardiff to find work or to secure a berth at sea. Unfortunately, during the period under report, despite efforts made, no progress can be reported in the direction of increasing the facilities

[1] Report of the Juvenile Employment and Central Care Committee of the City of Cardiff Education Committee, 1917–1918 and 1918–1919.

for training boys for the sea. Yet such a scheme would eventually restrict the number of foreigners employed in our mercantile marine and promote a freer and more ready recruitment of boys into a useful and profitable occupation; boys who now often become ne'er do-wells would have a chance of developing into useful members of society. The work of the school medical service in Cardiff has proved very useful in connexion with juvenile employment by reason of the valuable information given for every boy and girl dealt with, and the facilities available for special advice and examination of difficult individual cases. The need of work on behalf of children after leaving school is pressing everywhere; obviously in Cardiff good work has already been done by voluntary effort guided by expert organisation, and the directions in which this work can, and should, be extended are indicated.

ANTHRAX IN BRUSHES.

BY a provision of the Factory and Workshops Act of 1901 cases of industrial infection with anthrax were made notifiable to the chief inspector of factories at the Home Office. Dr. T. M. Legge, in his Milroy lectures four years later, dealt with 261 cases and 67 fatalities which had come before his official notice up to 1905. Of these, 70 cases with 17 deaths had to do with infection from hair and bristles. This particular source of infection has been attracting increasing attention since the incrimination of the shaving brush. The first case in which the shaving brush was definitely proved to be the lethal agent was recorded by Dr. R. R. Elworthy, then pathologist to the West London Hospital, in our own columns (Jan. 1st, 1916). At the instance of the Local Government Board a prolonged investigation was made by Dr. F. J. H. Coutts, which appeared in a volume of Reports on Public Health Subjects in 1917. Dr. Coutts found that brushes of home manufacture were implicated, as well as those imported from Canada, America, and Japan. Administrative action was taken upon this report, but the Ministry of Health announce that cases of anthrax are still occurring in this country, two of which have recently proved fatal. In a substantial proportion of the cases infection has been traced to new shaving brushes imported from Japan. Samples taken from several consignments of Japanese brushes have been found to contain anthrax spores. As several consignments of these brushes have already been distributed it is impossible for steps to be taken to discover them all. Intending purchasers are therefore advised by the Ministry to ask for an assurance that the brush offered for sale is not one of a batch recently imported from Japan. Any person in doubt as to a brush in his possession may diminish the risk by adopting the following procedure, although the Ministry does not suggest that any such process affords a certain safeguard against infection:—

Thoroughly wash the hair of the shaving-brush with soap and warm water, to which a little washing soda has been added, rinse in warm water, and then immerse for one hour in a disinfecting solution consisting of two tablespoonfuls of formalin in half a pint of water. The disinfecting solution should be at a temperature slightly above the body heat. After removal from the solution the brush should be allowed to dry before use. In carrying out the above, care should be taken not to allow the hair of the brush to come in contact with the hands.

In the meantime, and until infected shaving brushes have been excluded from the market, it may be remembered with satisfaction that a brush is by no means an indispensable tool for a successful shave.

THE CAMBRIDGE DIPLOMA IN RADIOLOGY.

RADIOLOGY is gradually taking up the position in the practice of medicine which its importance requires. In commenting in THE LANCET of Oct. 25th, 1919, upon Dr. A. E. Barclay's presidential address before the Section of Electro-Therapeutics of the Royal Society of Medicine we anticipated the practical recognition of this fact by one of the older universities. On Jan. 19th next, courses begin at Cambridge for the new diploma in radiology and electrology, set up by Statute on June 17th of last year. The course of study for the diploma extends over a period of six months or more, and includes both lectures and clinical instruction. The lecture course in Part I. consists of physics and electro-technics with photography; in Part II., radiology and electrology, in each case with special reference to both diagnosis and therapy. Six months clinical experience is required in the electrical department of a hospital recognised by a committee of the State Medicine Syndicate; for this purpose all the larger London teaching hospitals are eligible, as well as the Cancer and Consumption Hospitals at Brompton. Apart from examination, the diploma may also be granted to a medical practitioner of not less than ten years' standing who has been engaged for at least half that time in the practice of medical radiology at a recognised hospital, on presentation of a dissertation which may include work already published. Similar courses will be given in London and other centres as the demand for them arises. The actual arrangements, as far as at present fixed, are noted in another column. It is time that the subject, too long the playground of empiricism, should come under the discipline of a teaching faculty.

THE offices of Epsom College have been transferred from 37, Soho-square, W., to 49, Bedford-square, W.C. 1, owing to the expiration of the lease of the former house.

THE compulsory notification of cases of acute encephalitis lethargica and acute polio-encephalitis, in force since January, 1919, has been extended until further notice by order of the Minister of Health, dated Dec. 31st, 1919.

THE arrangements are now far forward for the formation of university units at two more metropolitan teaching hospitals—namely, St. Thomas's and University College. The appointments made in these connexions have for long been an open secret. At St. Thomas's Hospital Dr. E. H. Starling, professor of physiology at University College, becomes the director of the medical element, a capital appointment because it emphasises the close relations that physiology possesses with modern medicine. At this hospital Sir Cuthbert Wallace, surgeon to the hospital, will be the director of the surgical element. Mr. C. C. Choyce's name is given as the director of the surgical element at University College Hospital, where Dr. T. R. Elliott will be the director of the medical element.

INDEX TO "THE LANCET," VOL. II., 1919.

THE Index and Title-page to Vol. II., 1919, which was completed with the issue of Dec. 27th, will be published in THE LANCET of Jan. 17th.

THE DYING-OUT OF NATIVE RACES.

By W. H. R. RIVERS, M.D., F.R.S.

(Concluded from p. 44.)

European Influence on Native Customs.

I COME to a more serious cause when I consider European influence upon native customs. I begin with one which excites perennial interest whenever native welfare is discussed. Before the advent of Europeans many Melanesians went wholly nude or wore only garments, if they can be so called, which fulfilled neither of the two chief purposes for which the clothing of civilised people is designed. In other parts the native clothing consisted of petticoats, loincloths, or other simple garments thoroughly adapted to the necessities of the climate. One of the first results of European influence was the adoption of the clothing of the visitors, and clothes were adopted in such a manner as to accentuate the evils which they necessarily brought with them. The Melanesian is not really uncleanly. He bathes frequently, and where he preserves his native mode of clothing his ablutions are amply sufficient for cleanliness. When he wears European garments he fails to adopt measures, such as the frequent change of clothing, which then become necessary. He continues to bathe in his clothes, and instead of changing his garments frequently wears them continuously till they are ragged, and even when new clothing is obtained it is put on over the old.

It is a great mistake, often made, to blame the missionaries for this use of foreign clothing. It is true that its use was directly encouraged by the early missionaries, but this encouragement was unnecessary. To the native, trousers and coats are the distinctive marks of the white man, and nothing short of prohibition could have prevented their use. Where we now see the missionaries to have been at fault is that they did not recognise the evil of the innovation and set themselves steadily to minimise it, and insist upon attendance to the elementary principles of the hygiene which the use of clothes involves.

At the present time the influence of missionaries is steadily directed to this end. Having been privileged to live among missionarles of different schools of thought in Melanesia, I can testify that no subject is more frequently discussed and more thoroughly and anxiously considered than how to lessen the use and injurious influence of European clothing.

Another modification of native custom, which is less widely recognised, but in my experience quite as much in need of consideration at the present time, is housing. The native Melanesian house is usually rainproof and of good proportions, while owing to its mode of construction it is well ventilated and thoroughly adapted to the climate. Instead of being content with houses of similar construction or with houses of the kind used by Europeans living in other tropical countries, settlers have built houses with impermeable walls and very imperfect means of ventilation. These have in some cases been copied by the natives or even built by the missionaries for the use of their followers. Such buildings might have been specially devised for the propagation of tubercle, and if they are allowed to be built will certainly increase the already far too heavy ravages of this disease.

The modifications of housing and clothing which I have just considered touch especially the material side of life. I have now to consider a number of modifications and interferences with native custom which I believe to have been quite as important, if not even more important, in the production of native decadence. When Melanesia became subject to Europeans, magistrates and missionaries were sent to rule and direct the lives of the people. They found in existence a number of institutions and customs which were, or seemed to them to be, contrary to the principles of morality. Such customs were usually forbidden without any inquiry into their real nature, without knowledge of the part they took in native life, and without any attempt to discriminate between their good and bad elements. Thus, in the Solomon Islands, the rulers stopped the special kind of warfare known as head-hunting, without at all appreciating the vast place it took in the religious and ceremonial lives of the people, without realising the gap it would leave in their daily interests, a blank far more extensive than that due to the mere cessation of a mode of warfare. Again, in Fiji, the custom according to which the men of the community slept apart from the women in a special house, a widespread custom in Melanesia, seemed to the missionaries contrary to the ideals of the Christian family, and the custom was stopped or discouraged without it being realised that it formed a most effectual check on too free intercourse between the sexes.

In the New Hebrides, again, the missionaries put an end to, or where they did not destroy treated with a barely veiled contempt, a highly complicated organisation arising out of beliefs connected with the cult of dead ancestors. In some cases it was apparently enough that the institution, with all its elaborate ceremonial, was heathen and prejudiced church attendance, while elsewhere stress was laid on occasional revels and dances which gave opportunity for licence. It was not recognised that in forbidding or discouraging without inquiry they were destroying institutions which had the most far-reaching ramifications through the social and economic life of the people. I have called attention to this subject elsewhere in an essay on the Government of subject peoples in the Cambridge collection of essays, entitled "Science and the Nation." I have there pointed out that if these and similar institutions had been studied before they were destroyed or discouraged, it would have been found possible to discriminate between those features which were noxious and needed repression or amendment and those which were beneficial to the welfare of the community. Even if their destruction were still deemed necessary, something could have been done to replace the social sanctions of which the people were thus deprived. The point I wish to emphasise is that through this unintelligent and undiscriminating action towards native institutions the people were deprived of nearly all that gave interest to their lives.

Loss of Interest in Life the Cause of Native Decadence.

I have now to suggest that this loss of interest forms one of the reasons, if indeed it be not the most potent of all the reasons, to which the native decadence is due. It may at first sight seem far-fetched to suppose that such a factor as loss of interest in life could ever produce the dying-out of a people, but my own observations have led me to the conclusion that its influence is so great that it can hardly be overrated, and I venture, therefore, to consider it at some length.

When you inquire of those who have lived long in Melanesia concerning the illness and mortality of the natives, you are struck by the frequency of reference to the ease with which the native dies. Over and over again one is told of a native who seemed hale and well until, after a day or two of some apparently trivial illness, he gives up the ghost without any of the signs which among ourselves give ample warning of the impending fate. A native who is ill loses heart at once. He has no desire to live, and perhaps announces that he is going to die when the onlooker can see no ground for his belief.

The matter becomes more easy to understand if we consider the ease with which the people are killed by magic, or as the result of the infraction of a taboo. The evidence is overwhelming that such people as the Melanesians will sicken and die in a few hours or days if they believe that an enemy has chosen them as the victim of his spells, or that they have, wittingly or unwittingly, offended against some religious taboo. If people who are interested in life and do not wish to die can be killed in a few days or even hours by a mere belief, it becomes much more easy to understand that a people who have lost all interest in life should become the prey of any morbid agency acting through the body as well as through the mind. It is this knowledge of the enormous influence of the mind upon the body among the Melanesians and other lowly peoples that first led me to attach so much importance to loss of

interest as the primary cause of their dying out. Once this belief has been formulated there is seen to be much definite evidence in Melanesia to support it.

Certain islands and districts of Melanesia show a degree of vitality in striking contrast with the rest. These exceptional cases fall into two classes: one includes those islands or parts of islands where the people have so far been fierce and strong enough to withstand European influence. There are still parts of Melanesia which as yet the footprint of the white man has not reached, and others where, after successful encounters with punitive expeditions, the people still believe themselves to be a match for the invader. Here the old zest and interest in life persist and the people are still vigorous and abundant.

The other group of peoples who show signs of vitality are those who have adopted Christianity, not merely because it is the religion of the powerful white man, but with a whole-hearted enthusiasm which has given them a renewed interest in life. Here the numbers are increasing after an initial drop. Christianity and the occupations connected with it have given the people a new interest to replace that of their indigenous culture, and with this interest has come the desire to live.

The special point I wish to make to-day is that in my belief interest in life is the primary factor in the welfare of a people. The new diseases and poisons, the innovations in clothing, housing, and feeding, are only the immediate and more obvious causes of mortality. It is the loss of interest in life underlying these more obvious causes which gives them their potency for evil and allows them to work such ravages upon life and health.

Influences Decreasing the Birth-rate.

I can now pass to the second of the two groups of influences by which a people decline in number. I have so far dealt only with those which increase the death-rate. I have still to consider those which produce decline by diminishing the birth-rate. I must begin by stating briefly the evidence that this factor has played and is playing a part in the dying-out of the Melanesians. Here, as in the case of the death-rate, I can offer you no positive statistics derived from a record of births. My evidence is chiefly the result of a means of inquiry adopted originally for purely scientific purposes. When in Torres Straits with Dr. Haddon 20 years ago I discovered that the people preserved in their memories with great fidelity a full and accurate record of their descent and relationships. It was possible to collect pedigrees so ample in all collateral lines that they could serve as a source of statistical inquiry into such features as the average size of a family, infant mortality, and other subjects which furnish the basis for conclusions concerning the fluctuations of population. I have found this interest in genealogy wherever I have worked, and the collection of pedigrees has always formed the basis of my inquiries. In Melanesia this instrument shows conclusively that the fall in numbers is due quite as much to decrease of the birth-rate as to increase of the death-rate. I cannot here go into the evidence in any detail; I must be content with an example from the people of Vulua in Santo, a people whose decline has been mentioned as having been watched by Mr. Bowie during the last 20 years.

About 80 years ago, when Santo was comparatively untouched by outside influences, a man named Rathati married. He had four children, whose marriages gave Rathati 15 grandchildren, of whom my informant, a man verging towards middle life, was the sole survivor. Of these 15 grandchildren, ten grew to adult age and married, but only two of these unions produced offspring. One married couple had a boy who died in infancy, while another had three children. These three children, the great-grandchildren of Rathati, married, but none had offspring, so that a family, once rapidly growing in numbers, closed its career with a monotonous record of sterile marriages.

A similar frequency of childless marriages occurs in the pedigrees of other islands where the population is decreasing, not only in the New Hebrides, but also in the Solomons, showing definitely that lowered birth-rate must rank with enhanced death-rate as at least an equally important factor in the dying-out of the people.

Voluntary Restriction of Birth-rate.

I need only consider briefly the agencies to which this decline is due. It is well known that certain forms of venereal disease tend to produce sterility, and it is noteworthy that the dying-out of the people of Vulua is ascribed by their neighbours to the ravages of such disease brought with them by returning labourers from Queensland. There is little doubt, however, that if we take Melanesia as a whole, causes of this kind are trivial or of slight importance as compared with voluntary restriction. Throughout Melanesia the people are acquainted with various means of producing abortion, and practise measures which they believe to prevent conception, and processes of this kind form the main agencies in lowering the birth-rate. We have here only another effect of the loss of interest in life which I have held to be so potent in enhancing mortality. The people say themselves: "Why should we bring children into the world only to work for the white man?" Measures which before the coming of the European were used chiefly to prevent illegitimacy have become the instrument of racial suicide.

Reaction to New Interests.

It is satisfactory that before I leave this subject I am able to point to a brighter side. I have already said that in certain parts of Melanesia the downward movement in numbers has been arrested, and that the people now show signs of growth. I mentioned also that this was occurring especially in islands where the people have really taken to heart the lessons of their Christian teachers. I collected pedigrees from several such islands, and they tell a tale vastly different from the miserable record of Vulua. A man of the little island of Makura named Masosopo, who married about 70 years ago, had three children and nine grandchildren, and there are already 14 great-grandchildren, with a prospect of more to come, a striking contrast with the impending disappearance of the Vulua family. A couple who married about the same time in Nguna now have living and thriving 23 descendants, while in other islands I have records of families of from 8 to 10 in number.

The teachings of the missionaries concerning the evils of racial suicide have probably contributed to this recovery, but there is little doubt that its chief cause has been that their new religion has given to the people an interest in life which has again made it worth while to bring children into the world.

Effect of Labour Traffic.

Those here who know anything of Melanesia and its circumstances will have wondered why I have so far said nothing about the cause of depopulation which might well be put before all others for the potency of its evil influence. I have so far left the labour traffic on one side, partly because, had I once started upon it, I should have been tempted to devote the whole lecture to its far-reaching and deeply penetrating influence. My chief reason, however, was that it has seemed better to choose those of the circumstances of Melanesia which illustrate general problems and to leave on one side a factor which, though peculiarly potent in the case of Melanesia, is fortunately of far less general application. It would, however, be quite unfitting to leave the labour traffic wholly on one side.

In the first place it is well that we are able to distinguish between the traffic as it was and as it is. It would be difficult to exaggerate the evil influence of the process by which the natives of Melanesia were taken to Australia and elsewhere to labour for the white man. It forms one of the blackest of civilisation's crimes. Not least among its evils was the manner of its ending, when large numbers of people who had learnt by many years' experience to adapt themselves to civilised ways were, in the process of so-called repatriation, thrust back into savagery without help of any kind. The misery thus caused, with the resulting disaffection, not

only underlies most of the open troubles in the recent history of Melanesia, but by the production of a state of helplessness and hopelessness has contributed as much as any other factor to the decline of the population.

I must not, however, dwell on the crimes and mistakes of the past. My object to-day is to call attention to existing evils in the hope that they may be remedied before it is too late. At the present time Melanesians are only recruited as labourers to work within the confines of Melanesia, and both the recruitment and the conditions of labour are subject to Government control. Its grosser evils have been removed, at any rate in those parts of Melanesia which are wholly governed by Great Britain. But, however closely and wisely the traffic is controlled, the removal from their own homes of the younger men of a declining population is not a factor which can tend to arrest the decline or convert it into a movement in the opposite direction. Even in its vastly improved form, and limited to Melanesia though it be, the labour traffic continues to act as a cause of depopulation. Not only does it act directly by taking men away from their homes when they should be marrying and producing children, but it also fails in that it provides no real basis for that zest in life upon the importance of which I have already so fully dwelt. Other evils are that the traffic as at present conducted tends to spread disease and to undermine an influence which I believe to be at the present time the most potent for good in Melanesia, the work of the missionaries. I cannot stay to point out exactly how the traffic works to the detriment of native progress. I must be content to state again that aspect which brings it into relation with the main thesis of this lecture. It fails to give the people that interest in life which I believe to form the most essential factor in maintaining the health of a people.

Restoration or Replacement of Interests as the Sole Remedy.

I have dwelt at such length on the nature and causes of the decline of the population of Melanesia that I have left myself but little time to consider the treatment for the malady from which the peoples of this region are suffering. I make no apology, however, for this. One of my teachers in medicine, Dr. Gee, used to quote the saying[1]: "Medicine has three parts; the first is diagnosis; the second is diagnosis; and the third is diagnosis." This saying is just as true of the medicine of society as of the medicine of the individual. By diagnosis Dr. Gee did not mean, nor do I mean, the process by which we give a name to a disease. The word connotes the whole process by means of which we come to understand the nature of each individual case of disease, and analyse into its elements the complex web of agencies by which the morbid state has been produced. Taken in this wide sense, this lecture has thus far dealt wholly with the process of diagnosis. The more complete this diagnosis, the more obvious becomes the treatment and the less necessary to go into it at length. If I am right in my diagnosis it is easy to see the general lines which treatment should take.

I shall pass with a mere mention those lines of treatment, dictated by the ordinary principles of hygiene, by means of which faults of clothing, housing, and feeding may be remedied, and shall confine my attention to the factor which I believe to stand first and foremost among the causes of the dying-out of the Melanesian—the loss of interest in life from which at present he is suffering.

The main problem of treatment is how far it is possible to restore the old interests or maintain them where they have not yet been destroyed, and how far they must be replaced by others. As I have already mentioned, there are still parts of Melanesia where the old life persists with but little change, and it would be an interesting experiment to see how far it is possible in these places to maintain the old interests and make them the foundation on which to build a culture which would not conflict with that of the people who have become their rulers. I have dealt with this subject in the essay on "The Government of Subject Peoples," already mentioned. I will only reiterate here the main conclusion of that essay, that any attempt to govern a people even partially on the lines of their own culture demands knowledge on the part of the rulers, knowledge which at present they do not possess, and in general make no effort to attain.

I will, therefore, only refer to-day to the second alternative, how we may replace old interests by new. To one such new interest, that of religion, I have already referred. The old life of the people was permeated through and through by interests of a religious kind, based on a profound belief in continued existence after death and the influence of the dead upon the living. Experience shows that Christianity is capable of giving the people an interest in life which takes the place of that due to their indigenous religion. Man cannot or should not, however, live upon religion alone. It is necessary to find something to take the place of the old economic interests also. At the present time, throughout the greater part of Melanesia, the people either give their work wholly for others on plantations or grow just the few coconuts which are necessary to produce certain luxuries, such as calico and tobacco, gramophones and tinned meat.

The chief need in Melanesia is to give the native a more real interest in the economic development of his country. The Melanesian is a keen trader, and there are cases in the New Hebrides in which he has shown much ability when he has entered as an ordinary trader into competition with the European. There is no question that if he were given a fair chance he could take an important part in any organisation which had as its object the encouragement of native industry. Until recently the missionary societies of Melanesia have made no attempt at industrial development, either to encourage the old industries or to introduce new, and the Government has done even less in this direction. The only neighbouring region where anything of the kind has been done is in Torres Straits, where "The Papuan Industries Company" has endeavoured, with a fair degree of success, to give to the natives that share in the management of the industries of their country which is the best means of bringing back the old interest and zest in life. In other parts of the world, and pre-eminently in West Africa, such movements have had the most striking success, and there is no reason why the success should not be as great in Melanesia.

Among the many problems which await our rulers when they are able to turn their thoughts from more pressing matters is the industrial development of the tropics. For this purpose labour is necessary, and experience shows that this labour comes most naturally and most profitably from those in whom long generations have brought about a physical development adapted to tropical conditions. The main object of this lecture has been to draw attention to a psychical aspect of the problem. The indigenous inhabitants of tropical countries will not thrive, they will in some cases, as we have seen, not even live, unless they are interested in life, and this factor of interest must be taken into account by those upon whom falls the task of organising the development of tropical industry.

Though this utilitarian aim must of necessity be prominent in the organisation of tropical industry, there is another reason which should compel us to give to the natives of tropical countries a real interest in their own social and economic development. If we in the late war gave our best blood on behalf of oppressed nationalities and in the cause of freedom, it should be equally impossible to pass over the rights of such peoples as the Melanesians. I have tried to show in this lecture that the fundamental right, the right to exist, is being threatened in their case. If there is any truth in this view the peril may be averted, and averted by giving back to them that interest in life which we have, often unwittingly, destroyed.

[1] I have been unable to discover to whom this aphorism is originally due.

Mr. G. S. A. Waylen has resigned the post of district medical officer and workhouse medical officer of the Devizes Union after 30 years' service.

THE NEED FOR REWARDS FOR MEDICAL DISCOVERY.

THE following report (dated Dec. 22nd, 1919) has been presented by the Joint Committee of the British Medical Association and the British Science Guild on awards for medical discovery:—

1. *Definitions.*

Medical discovery may here be defined as being: (1) The ascertainment of new facts or theorems bearing on the human body in health, and the nature, prevention, cure, or mitigation of injuries and diseases of human beings. (2) The invention of new methods or instruments for the improvement of sanitary, medical, and surgical practice, or of scientific and pathological work.

2. *Reasons for Rewarding Medical Discovery.*

These are: (1) To encourage medical investigation. (2) To discharge a moral obligation incurred by the public for its use of private effort.

3. *Various Possible Types of Rewards.*

(1) Titles and honours given by the State, by universities, and by other public bodies. (2) Prizes and medals. (3) Patents. (4) Promotions and appointments. (5) Pecuniary awards by the State.

4. *General Principles of Assessment.*

It will probably be agreed that in the interests of the public all medical discoveries should, if possible, receive some kind of acknowledgment or recompense. But in view of the very variable conditions, nature, and effects of particular investigations, it will often be difficult to assess the kind of recompense most suitable for each. In the first place, a distinction should be drawn between *compensation* and *reward*. By *compensation* is meant an *act of justice* done for the purpose of reimbursement of losses; by *reward, an act of grace* in appreciation of services rendered.

The following different cases should next be considered:—

(A) Discoveries involving pecuniary or other loss to an investigator, either by direct monetary sacrifice, or by expenditure of time, or by diminution of professional practice, without corresponding pecuniary gains. A great example is that of Edward Jenner, who occupied himself so closely with the investigation of vaccination against small-pox that he lost most of his medical practice and also considerable sums in expenses. The plea for compensation in such cases is unanswerable; and in 1802 and 1807 Parliament fully acknowledged its obligations under this head by giving Jenner compensation in two sums of £10,000 and £20,000.

(B) Discoveries which have increased the professional emoluments of the investigator by enhanced practice or other means. Such are, frequently, improvements in surgical operations or medical treatment, which lead to increased practice. Another case is that of serums, &c., which may have been protected and put on the market. Here compensation cannot be demanded and pecuniary awards may be generally held to be unnecessary. On the other hand, honours are often, and justly, bestowed upon such work.

(C) Discoveries which involve neither gain nor loss to the investigator. This class includes most of the good, and sometimes great, clinical, pathological, and sanitary discoveries achieved in the world. Here also compensation can scarcely be demanded, and honours are already often given; but pecuniary awards should be sometimes bestowed as an act of grace when the value of a discovery to the public (or to a government) greatly exceeds the emoluments of the investigator; and this principle should hold even in the case who were directly paid for undertaking the researches which led to their discoveries—especially when such payment was (as usual) small, and the resulting discovery great.

The following particular cases, which sometimes occur, should be specifically noted: (1) Men who have refused lucrative posts in order to complete their researches. (2) Men who have refused to protect their work for fear of limiting its application. (3) Men who have carried out investigations for governments for little or no payment, on patriotic grounds.

The following considerations must generally be borne in mind:—

(*a*) Honours (which are always much esteemed) are usually given as much (or more) for clinical success as for medical discoveries, though the latter possess a far wider influence and application than do the former.

(*b*) When given for clinical work or for discoveries under Class B, honours often confer distinct pecuniary advantages by enhancement of practice, but for discoveries under Classes A and C they have no such effect, and cases are on record where they tend to reduce emoluments by unfitting recipients for certain posts.

(*c*) Most people enter the medical profession (at considerable expense) not only from altruistic motives, but also to make a living; and it is usually only at a later period that they take up scientific investigation—either from a sense of duty, or from predilection, or merely because a good opportunity offers. When, therefore, a man finds that his scientific work, however successful and important it may have been, has actually yielded him less emolument than he might have obtained from ordinary clinical work, he feels naturally discouraged; and his experience prevents young men of ability from following his example, and therefore tends to check the prosecution of studies which are of the highest value to humanity.

(*d*) In the public interest, then, this Committee begs to insist upon the principles: (1) That no medical discovery should be allowed to entail financial loss upon him who has made it. (2) That the compensation or reward which he deserves should be assessed as being equal to the difference between the emoluments which he has actually received and those which a successful clinician might have received in the same time.

This is obviously the principle which was accepted by Parliament in the case of Jenner in 1802 and 1807.

Additional reasons for insisting upon this principle are: (1) That few medical discoveries are patentable. (2) That such discoveries seldom give good grounds for promotion or for administrative appointments in the public services.

5. *Particular Assessments.*

Whether a particular discovery should receive a large or small assessment will depend not only on the considerations given above, but also on the following:—

(1) *Width of application.*—For example, the work of many of the older anatomists, physiologists, and parasitologists, of Pasteur, and of investigators of immunity, have affected most recent discovery. Discoveries on widespread diseases, such as the work of Lister, of Laveran, and of Koch, are often, though not always, more important than those on more limited maladies.

(2) *Difficulty of the work done.*—For example, the solution of a difficult problem requires more study and also more time and cost, and therefore deserves more recompense than a lucky chance observation.

(3) *Immediate practical utility.*—A strong plea for State remuneration can be made on behalf of cases of this kind, unless they come under Class B. It is strange that at present they never receive it, while academical recognition is also often not forthcoming for them.

(4) *Scientific importance.*—Discoveries which are not of present practical utility may become so at any moment, and should obviously be included in the scheme, if they are sound and of wide application.

Medical discoveries made by persons who do not themselves belong to the medical profession should be included in all schemes of reward. Of course, each case must be judged on its merits, and the assessment will not always be easy.

6. *State Awards for Medical Discovery.*

Honours, prizes, and medals, being bestowed by H.M. the King or by public bodies and learned societies, are acts of grace which are generally given after much consideration; and the Committee does not purpose to consider them. But the subject of *pecuniary awards* lies entirely within its province. During the last few years the British Government has disbursed an annual grant of about £60,000, under the Medical Research Committee, for subsidising *investigations in progress* authorised by the Committee and carried on by workers selected by it. This grant does not remunerate discoveries *already made*, but proceeds upon the principle of payment for benefits *already received*, deserves close attention and has been recognised in other countries.

We think that both principles are sound. But they apply to two different classes of research, and are, indeed, complementary of each other. Payment for prospective benefits is "good business" only when some return is almost certain; and for this reason subsidised researches must frequently deal with simple and straightforward questions admitting of immediate experimental reply. But, as a matter of fact, most of the greatest medical discoveries were built upon a much more speculative and uncertain basis; and were achieved by men who neither sought nor received subsidies for those investigations—as, for instance, Küchenmeister, Jenner, Sims, Simpson, Lister, Koch, Laveran, Bancroft, Manson, Bruce, Mackenzie, and a score of others who have so greatly improved medical practice. Surely the State should encourage this class of investigation also—partly because it costs the State nothing in the doing, and partly because it seems to achieve the greatest results. And there is only one way to encourage it—by paying for discoveries when made. Payment for benefits received is always not only "good business," but also a moral obligation. There are at present hundreds of medical men and others in this country who possess the knowledge, the brains, and the opportunity for private independent discovery, without subsidies, but who do not attempt it because medical research work does not

pay even when brilliantly successful. Let these men also be brought into the fold of research by offering them reward when they succeed.

We therefore suggest that in addition to assisting investigations in progress it is proper for the State to remunerate those of its subjects who have already conferred the benefits of medical discovery upon it, just as it is proper for a patient to pay his doctor. And this policy will be not only an act of justice but an act of wisdom.

Our proposals are in detail:—

(1) That Parliament should resuscitate the precedent of Jenner by paying *compensation* when due for losses incurred in achieving medical discoveries.

(2) That Parliament should provide an annual sum, say of not less than £20,000, for life pensions to be given as rewards to such of His Majesty's subjects as have made worthy medical discoveries, such pensions amounting to between £500 and £1000 a year.

Such pensions would be preferable to donations in capital, and the sums suggested would be sufficient, because men of science seek only such independence as will enable them to employ their talents in the manner they think best.

The procedure of allotment should be similar to that used for the Nobel Prizes and for the honours and medals of learned societies—that is, full particulars of the work of all applicants should be kept and considered. Parliament grants large subsidies to soldiers and sailors, has appointed a commission to consider awards to inventors, and allows patents. It should not, therefore, complain if the medical profession, which has done so much for the nation during the war, now asks for some similar consideration.

(This Committee is concerned only with medical research, but recognises that similar awards should be given to workers in other fields.)

The Joint Committee.

The following are the members of the Joint Committee:—

Representing the B.M.A.—Sir T. Clifford Allbutt, K.C.B., F.R.S., Dr. R. T. Leiper, Professor Benjamin Moore, F.R.S., E. B. Turner, Esq., F.R.C.S., Professor J. S. Haldane, F.R.S.

Representing the B.S.G.—Lieutenant-General Sir Alfred Keogh, G.C.B., Colonel Sir Ronald Ross, K.C.B., K.C.M.G., F.R.S., Professor W. Bayliss, F.R.S., Dr. D. Sommerville, Sir Richard Gregory, Lieutenant-Colonel O'Meara, C.M.G., late R.E.

THE PRODUCTION AND DISTRIBUTION OF MILK.[1]

IN April, 1917, a Committee was appointed, on the instruction of the Cabinet, by Lord Ernle, the President of the Board of Agriculture and Fisheries, with the concurrence of the Food Controller, the late Lord Rhondda, "to report on the production and distribution of milk, including the consideration of the steps which should be taken (1) to stimulate production; (2) to conserve milk-supplies during any period of excess; (3) to provide for the special needs of children in urban centres; (4) to effect economies in the cost of production and distribution; (5) to organise supplies by administrative action, so as to reach all sections of the community; and (6) other kindred subjects." During the period of inquiry three interim reports have been issued dealing with questions of immediate urgency. These were published respectively in June and November, 1917, and November, 1918 (C.D. 8608, C.D. 8886, and C.D. 315).

The report before us, which is final, deals chiefly with matters affecting the milk industry and its development in the future, including both the period of post-war abnormal conditions, which we may safely and sadly predict will continue for some time, and the subsequent period when the effects of war will no longer operate. The report is signed by a strong personnel, with Viscount Astor as chairman, and the list of witnesses—representatives of the agricultural and dairy industries—interviewed by the Committee adds authority to the recommendations which have been drawn up.

Population in Relation to Producing Capacity.

One early and outstanding feature of the report is the fact that the production of milk in Great Britain in recent years has not kept pace with the increase in the human population nor with the demand of the latter for milk products. It will be agreed that an increase in the human population since 1871 of 60 per cent. against an increase in the number of cows and heifers of only 40 per cent., as compared with an increase in the weight of imported dairy products of 235 per cent., cannot be considered as satisfactory. The increased importation of condensed and dried milk is enormous, and the value of imported dairy products reached in 1914 no less a sum than £38,000,000. And yet the Committee reports that the countries exporting these products to our shores have no natural advantages of climate or soil which are not possessed to an even greater degree by large sections of the United Kingdom, which also offers to the British dairy-farmer the advantage of proximity of markets. In other words, the British dairy-farmer is found wanting. He has shown a lack of enterprise or intelligence, and has neglected the opportunities which this report brings to view—opportunities and advancement of the greatest importance to the well-being of the community. Let it be granted that no Government has done much to help him in his difficulties.

The Nutritive Value of Milk.

The Committee has previously put on record the well-considered opinion that the average consumption of milk in the United Kingdom is much lower than is desirable in the national interest. As is pointed out, milk contains all the nutritive constituents required by the body in a readily assimilable form, which makes it a valuable food for all classes of the community, and especially for children. For infants who are dependent on artificial feeding milk is obviously essential, and in the opinion of the Committee milk ought to be available in greater quantities than are at present obtainable. This serious conclusion means a milk shortage, which threatens the life and vitality of coming generations. The importance, besides, of the presence of growth-promoting substances in milk is well indicated in the report.

It is not surprising that the inquiry brought to light the unsatisfactory conditions of the milk industry in this country, while evidence is given showing that an increased consumption and production of better and cheaper milk are urgently needed. This, it is admitted, cannot be accomplished hurriedly, and only real progress can be made by such methods as will command sympathy and coöperation from both producers and consumers.

An Enlightened Milk Policy.

In the Committee's opinion the aims of an enlightened milk policy should be:—

(*a*) To bring about the utmost possible economy in production in order that: (i.) prices may be kept at as low a level as possible to the consumer, and consumption thus increased to the desired standard; (ii.) an adequate supply may be brought within the reach of the poorest families.

(*b*) To improve the hygienic quality of milk and to ensure that the portion of the supply which requires or is subjected to pasteurisation is efficiently pasteurised under supervision.

(*c*) To increase the total supply in order to meet the extended consumption that should follow improved quality and the education of the public with regard to the nutritive properties of milk.

(*d*) To prevent the exploitation of the producer or the consumer by any trust or combination, either of a provincial, national, or international character.

In regard to pasteurisation, the Committee suggests that a definition of pasteurised milk should be set up, and that it should be sold as such and not as fresh milk. It regards pasteurised milk as by no means a substitute for clean milk production and cleanliness in handling milk.

Herd Management and Economy of Production.

There are interesting details in the report as to herd management and many other dairy-farming details, but we may note the remark that probably the greatest economy in the production of milk can be effected by increasing the yield of individual cows. It is pointed out

[1] Final Report of the Committee on the Production and Distribution of Milk (Cmd. 483). Price 1*s.* 6*d.* net. Printed and published by His Majesty's Stationery Office.

that if the average yield per cow in the United Kingdom could be increased by one-tenth of a gallon per day the cost of milk at present prices would automatically fall about 2*d*. per gallon without affecting the profit made by the farmer. By paying stricter attention to the methods of feeding it is reckoned that an increased yield from 1½ to 2 gallons per cow could be effected, which would solve the problem of scarcity and materially bring down prices. Then comes the suggestion of official milk-recording centres being established, a scheme which, in the opinion of the Committee, has been by far the most effective agent in the improvement of dairy stock throughout the world. Sensible proposals are also made in regard to the selection of dairy bulls, the real test of which should be the power to beget offspring which will yield large quantities of rich milk.

Conclusion.

Such are some of the salient features of the report, a study of which shows how thoroughly the Committee has gone into the great and manifold questions involved—questions, amongst many others, of improved transport facilities, preservation, and uncontaminated supplies. Agricultural developments apart, which deserve the serious consideration of the dairy industry with a view to increased production, the hygienic or scientific demands have received anxious attention, the Committee evidently having settled upon the need of adopting a policy which should lead to the ultimate provision of both a clean and an abundant supply of milk to the community.

CONTROL OF VENEREAL DISEASES.

The Anti-Venereal Campaign.

THE campaign against venereal disease so ably inaugurated by the National Council for Combating Venereal Diseases is in danger of losing in effectiveness from an internecine struggle with the Society for Prevention of Venereal Disease, of which it was the predecessor and in large measure the progenitor.

The position of the N.C.C.V.D.—In their memorandum of Nov. 10th the National Council made these among other statements:—

2. It is no part of our policy to conceal the truth, and we have always acknowledged the value of cleansing and disinfecting materials, applied early and thoroughly, in diminishing the risk of disease.

3. Abstention from exposure to infection is the only certain safeguard against the ordinary risk of disease; continence is to be encouraged by every means and on every ground, both social and hygienic.

4. No person who has indulged in promiscuous intercourse can be sure that he is not infected, and every such person is, therefore, bound in duty to him- (or her-) self and to society to seek means of cleansing at the earliest moment.

5. For this purpose a thorough local application of soap-and-water is of great value, followed (if possible) by the use of such disinfectants as may be recommended by a medical practitioner.

It is evident from these clauses that the National Council believe in the efficiency of immediate self-disinfection and advocate its application. The work of the Council, freely spent in the inculcation of chastity, needs no emphasis from us.

The position of the S.P.V.D.—The Venereal Prevention Committee, or, as it has now become, the Society for the Prevention of Venereal Disease, advocates the immediate application by the individual concerned of certain disinfectants, selected by a consensus of opinion on the part of the medical members of the society. In this respect the suggestion enunciated by the N.C.C.V.D. in Clause 5 of their memorandum is complied with. With regard to the attitude of the society to the question of morality, there is no colour for the suggestion which has been made that its members are indifferent to the importance of promulgating the value of chastity. Lord Willoughby de Broke, in his speech in the House of Lords on Dec. 10th, made it clear that the importance of chastity was realised by the society over which he presides. Because the immediate objective of the society is the direct prevention of disease, and because it takes the dictates of morality as read, this does not imply indifference or antagonism. At a recent meeting, held under the auspices of the Insurance Faculty, Miss Norah March enunciated the views of the society thus:—

"In the meantime we must face the problem of the unchaste. Are they to be allowed to continue unaware or insufficiently appreciative of the possible consequences of unchastity? or are they to be impressed with the necessity—if they are determined on anti-social behaviour—for safeguarding themselves, in so far as it is humanly possible, in the interests of others, from the possible consequences of their action? Surely it is a matter of moral responsibility to take all possible precautions, and such education as the Society for Prevention of Venereal Disease proposes to put at the disposal of the public is intended *to throw onus upon the individual*, to make him responsible, if he does not conform to the social code, for limiting the evil results of his anti-social behaviour to the narrowest degree possible."

The society does not advocate free distribution of prophylactic packets or the indiscriminate urging of people to provide themselves with them. Its members, while recognising the value of chastity, realise also that many individuals will, in spite of all deterrents, indulge in promiscuous intercourse, and they regard it as their duty to the community to ensure that such individuals are acquainted with methods of reducing their chance of acquiring and conveying infection. The society would confer a greater gain on the community by laying more emphasis, in the instructions which they issue, upon the value it attaches to the practice of continence, and upon the undoubted fact that, while properly applied medicaments will in the majority of cases ensure safety, yet there can be no absolute guarantee.

The future of these two bodies.—It would be a national calamity if the effort associated with either of these bodies were to be eliminated. Should the National Council sink into abeyance, its valuable educational and propaganda work at home and abroad would be nullified. In view of the fundamental similarity of policy in the programmes of the N.C.C.V.D. and the S.P.V.D. there is nothing to preclude members of the one body from assuming or retaining membership of the other. By such a condition of dual membership a better understanding might be reached and unnecessary friction obviated. There is no logical reason against the dual allegiance, since, as we have seen, both bodies inculcate the need of immediate self-disinfection and both are alive to the importance of the practice of chastity. A conjoint crusade would be to the national gain. The National Council has the machinery, the experience, and the staff for organising and effectively carrying out educational measures. The Prevention Society appears the better adapted for stamping out disease by sanitary methods. By a sympathetic and broad-minded coöperation in principle and a wise division of specialised labour there is an opportunity of benefiting both the generation that is and those which are to come.

A Plea for an Experimental Early Treatment Centre for London.

Whilst controversy rages with regard to the respective merits of immediate disinfection and early treatment, hundreds of individuals are daily becoming infected in London alone. Insistence is laid by the advocates of early treatment upon the necessity which exists for individuals to seek assistance within a few hours after exposure to infection. In order that this advice may be put into practice it is necessary for an early treatment centre to be available during the whole of the 24 hours of the day. As far as we are aware no such accommodation exists. We strongly urge the necessity of at once instituting such a centre, and thus rectifying a position which is as illogical as it is callous. The advantages of an all day and night centre would be multiple.

1. It would undoubtedly prevent the development of much disease, especially amongst those (and they will long be with us) who for various reasons do not have recourse to immediate self-disinfection.

2. It would, after trial, give a substantial idea as to the necessity, quantitative and topographical, which exists for such centres.

3. Being admittedly of an experimental nature, improvements in technique and organisation which presented themselves could readily be adopted. After the attainment of a reasonable standard of perfection other clinics could then be founded and worked on similar lines.

The organising, equipping, and staffing of an experimental pioneer centre need occupy but a short time. If instructions were given to-day such a centre could be in full working order in two to three weeks. Knowledge of the existence and the situation of the centre could be promulgated by the same methods as are already utilised for making known the ordinary V.D. clinics. The number of cases attending these clinics are increasing rapidly, and we are justified in regarding the carrying out of the above suggestion as essentially an emergency measure. We commend it to the Ministry of Health and the medical department of the London County Council.

The Appointment of Medical Officers to Treatment Centres.

It was inevitable that, during the war, venereal clinics should be placed in charge of medical men who had but little experience in the diagnosis and treatment of venereal diseases. Now that the number of specially qualified practitioners has increased, it is necessary in the interests of the community at large for clinics to be placed in charge of those who have gained sufficient experience to justify their acceptance of such posts. Unless a high standard of efficiency is insisted upon treatment will be prolonged and its cost unnecessarily increased. No electoral body should appoint a medical officer to take charge of a clinic unless he produces evidence of adequate instruction in a recognised institution or has otherwise gained equivalent experience.

The Low Venereal Record in the American Expeditionary Forces.

Colonel Ashburn[1] of the United States Army states that the incidence of venereal disease in the American Expeditionary Forces varied for the greater part of the time, during which large numbers of American troops were present in France, between 62 and 31 per 1000, the average being about 45 cases per 1000 men annually. The rate rose rapidly as troops were being sent home, but this rise was partly fictitious, and the true rate at this time could not be determined. It was a remarkable fact that the corresponding incidence in the United States was always reported as higher than in France, averaging about 60 even after the armistice. In order to set an explanation of the low incidence rate of venereal disease in France a questionnaire was sent out to obtain information on the following subjects: (1) What is the percentage of chaste men among soldiers? (2) What is the average number of unprotected venereal contacts to each case of venereal disease? (3) What proportion of men have been exposed to venereal disease without using prophylaxis? More or less complete answers were obtained from 13,648 men located in four base sections, principally at Bordeaux, St. Nazaire, Brest, and Tours. It was found that 34 per cent., or about a third, had abstained from sexual intercourse while in France. Another third of all the men had indulged in intercourse so infrequently as to make their chance of acquiring disease quite small, so that relative continence was probably next in importance to real chastity in keeping down venereal disease. From a study of the replies and from collateral evidence Ashburn came to the conclusion that in France there were about 30 unprotected contacts with women of promiscuous sexual habits for each case of resulting venereal disease, while prophylaxis reduced the incidence to about one-third of what it was without prophylaxis. The much greater relative frequency of soft chancre in France, approximately two-fifths of all venereal disease, and the lesser relative frequency of gonorrhœa suggested that prophylaxis was less effective against chancroid than against gonorrhœa or syphilis. The contact rate among men on leave was very high. 50 to 70 per cent. of the venereal disease in the army came from leave areas, and from towns en route thereto. According to statements made by 614 men with venereal disease alcohol seems to have played a smaller part as a factor predisposing to venereal disease in the American Expeditionary Force than might have been supposed. Of the 614 only 215 admitted the use of alcohol before exposure, and 85 admitted intoxication.

[1] Journal of the American Medican Association, Dec. 13th, 1919.

A Post-graduate Course of Instruction.

A post-graduate course of instruction in the diagnosis and treatment of venereal disease is being arranged by Mr. K. M. Walker at St. Bartholomew's Hospital Clinic, Golden-lane, E.C., established by the Corporation of London. The first course will be confined to male practitioners, of whom 15 can be accommodated. The suggested dates are Thursday afternoons at 5.30 P.M. The beds attached to the clinic are available for the reception and study of suitable cases in addition to work in the out-patient department. Any medical practitioner wishing to attend is invited to send his name to the Medical Secretary, National Council for Combating Venereal Diseases, 81, Avenue Chambers, Southampton-row, London, W.C. 1. If more than 15 names are received a second course will be held as soon as possible after the termination of the first.

TUBERCULOSIS.

Tuberculosis in Birmingham.

THE report on tuberculosis in Birmingham in 1918 by the chief tuberculosis officer, Dr. G. B. Dixon, brings out many points of exceptional interest. In this year, 3254 cases of tuberculosis were notified, as compared with 3543 in 1917. The mortality for 1918 was 1385, and as somewhat similar figures have been returned for earlier years, the calculation is made that the actual mortality among the cases notified is about 42 per cent. In other words, about 58 per cent. of the persons notified recover. In Birmingham there are more than 16,000 cases of the disease at any one time, the cost of which to the city is at least one million a year. There is, therefore, every justification for the expenses incurred in stamping out the disease, all the more as there are many indications that its incidence is being reduced. As judged by notifications, the report shows a definite decline of the incidence of pulmonary tuberculosis. The war has, however, increased the mortality among the persons already suffering from tuberculosis. A comparison with the notifications in five other large towns shows that, with 248 notifications per 100 deaths, Birmingham comes first, the ratio of notifications to 100 deaths being as low as 167 in Manchester, and 176 in Leeds. A table showing the incidence of, and mortality from, tuberculosis at various ages brings out the curious fact that whereas the incidence and mortality are about equal in the two sexes up to the age of 15, at every age-period over 15 the incidence and mortality are much higher in the male—often more than twice as high. Those who maintain that bad housing is the most important factor in producing tuberculosis will be surprised to find that in 1918, as in previous years, the incidence of the disease among males aged 35 to 45 was 7·69 per 1000 living at these ages, as compared with 3·33 per 1000 females of the same age. Again, the mortality rates at these ages for males was 4·46, as compared with only 1·55 per 1000 for females. Yet women at these ages spend far more of their time in the dwelling-house than do the men. The report includes an account by Mr. J. Malcolm, M.R.C.V.S., of tuberculosis with reference to the milk-supply.

Borough of Poplar Dispensary.

The report of this dispensary, which was founded as a memorial to King Edward VII., is for the years 1917–18. Many pages are devoted to tables showing the amount and nature of the work done. The scope of this work is ever widening and bringing the dispensary into some new official relationship or other. But the lack of suitable institutional accommodation for advanced cases of pulmonary tuberculosis is deplored, and the fact that such cases are still dependent on the Poor-law infirmary is recognised as a grave flaw in the antituberculosis campaign.

Sanatorium Benefit in Ayr.

In the report for 1918, the Insurance Committee for Ayr reviews the results of institutional and domiciliary

treatment since July, 1912. The total number of applications made for sanatorium benefit was 1375. Of these cases, 887 received treatment, and of these again, 289, or 32·58 per cent., terminated fatally. Many of the 163 patients who could not be traced were also probably dead. The calculation is then made that about 41 per cent. of the patients treated since July, 1912, were dead. Another series of investigations into the subsequent histories of patients who had undergone treatment showed that of 200 patients who were in different states of health after treatment in 1915, as large a proportion as 29·5 per cent. were dead by the end of 1918. With regard to the 52 discharged soldiers who had completed their treatment, about 46 per cent. were already dead.

Sanatorium Benefit in Wigan.

In the report for 1918, the tuberculosis officer for the county borough of Wigan, Dr. G. Jessel, analyses the results of sanatorium benefit since July, 1912. Of the 568 applicants for benefit, 491 were actually suffering from pulmonary tuberculosis, and of these again 184 were alive at the end of 1918. The number of patients who could not be traced was 90. Of the 184 who were traced 84 were fit for work, 46 were fit for light work, and 54 were unfit for any work. Thus about 71 per cent. were fully or partly restored to working capacity. On the other hand, 217 were dead.

List of Sanatoriums Approved by the Ministry of Health.

The Ministry of Health, in a circular dated Nov. 29th, 1919, has drawn attention to a list that has recently been drawn up of the sanatoriums and other residential institutions approved by the Ministry under the National Insurance Act, 1911, for the treatment of persons suffering from tuberculosis and resident in England and Wales. The names of the administrative counties and county boroughs in which these institutions are situated are given, as well as the date on which the approval expires in each case. This list, price 3*d*., can be obtained from H.M. Stationery Office. The Ministry's circular also reminds local authorities that no fee is payable in respect of the notification of cases of tuberculosis under the Public Health (Tuberculosis) Regulations, 1912, by the medical officer of a sanatorium, as defined in Article 1 (1) of the Regulations.

Milk and Tuberculosis.

The Committee on the Production and Distribution of Milk accepts the findings of the Royal Commission on Tuberculosis to the effect that :—

"Primary abdominal tuberculosis in man, as well as tuberculosis of the cervical glands, is commonly due to ingestion of tuberculous infective material. A considerable amount of tuberculosis of childhood is to be ascribed to infection with bacilli of the bovine type transmitted to children in meals consisting largely of the milk of the cow."

The Committee is aware that subsequent work has confirmed this. At the same time it does not desire to create unnecessary alarm by exaggerating the extent of human tuberculosis due to bovine infection, for it realises :—

1. That much infantile debility leading to susceptibility to many diseases including tuberculosis is due to inadequate milk consumption.

2. That many children must be drinking some tuberculous milk without suffering evil effects.

3. That all reacting cows do not necessarily give tuberculous milk.

4. That the risk from tuberculous milk may be practically removed by efficient pasteurisation.

A MONTHLY RECORD OF ATMOSPHERIC POLLUTION.

METEOROLOGICAL OFFICE: ADVISORY COMMITTEE ON ATMOSPHERIC POLLUTION: SUMMARY OF REPORTS FOR THE MONTHS ENDING

June 30th, 1919.

Place.	Rainfall in millimetres.	Metric tons of deposit per square kilometre.								
		Insoluble matter.			Soluble matter.		Total solids.	Included in soluble matter.		
		Tar.	Carbonaceous other than tar.	Ash.	Loss on ignition.	Ash.		Sulphate as (SO_3).	Chlorine (Cl).	Ammonia (NH_3).
ENGLAND.										
London—										
Meteorological Office	37	0·10	0·84	2·30	1·48	1·48	6·20	0·65	0·63	0·03
Embankment Gardens... ...	32	0·18	4·20	10·91	2·25	3·31	20·84	1·93	0·67	0·15
Finsbury Park..	31	0·04	0·70	3·05	0·72	1·22	5·73	1·04	0·24	0·04
Ravenscourt Pk.	39	0·36	7·00	29·85	2·61	4·93	44·65	2·10	1·32	0·44
Southwark Park	40	Nil	0·12	0·20	1·49	2·03	3·84	1·45	0·34	0·09
Golden Lane ...	33	0·03	1·86	2·89	0·93	2·25	7·96	1·19	0·64	0·25
Malvern...	23	Tr.	0·07	0·30	0·30	0·95	1·63	0·41	0·10	0·01
Southport—										
Hesketh Park..	33	0·02	0·44	0·93	0·94	3·76	6·09	1·15	0·64	0·06
Woodvale Moss	35	—	—	—	—	—	5·33	—	—	—
SCOTLAND.										
Glasgow—										
Alexandra Park	112	0·07	1·38	3·84	2·01	5·28	12·58	2·94	0·71	0·24
Bellahouston Pk.	97	0·24	2·08	2·85	1·24	5·42	11·83	2·56	0·25	0·18
Blythswood Sq.	114	0·12	1·55	4·89	4·87	4·64	16·07	2·42	0·48	0·27
Botanic Gdns....	119	0·04	0·78	2·51	2·85	7·09	13·27	3·21	0·31	0·16
Richmond Park	105	0·04	1·44	4·10	0·31	7·06	12·95	2·90	0·29	0·26
Ruchill Park ...	116	0·02	1·64	3·51	2·73	5·31	13·21	2·07	0·32	0·14
South Side Park	112	0·04	1·55	2·33	1·72	5·64	11·28	2·91	0·27	0·19
Tollcross Park..	103	0·03	1·71	4·01	2·03	6·20	13·98	2·14	0·40	0·25
Victoria Park ...	121	0·03	0·77	2·56	4·27	7·36	14·99	4·96	0·29	0·28

July 31st, 1919.

Place.	Rainfall in millimetres.	Metric tons of deposit per square kilometre.								
		Insoluble matter.			Soluble matter.		Total solids.	Included in soluble matter.		
		Tar.	Carbonaceous other than tar.	Ash.	Loss on ignition.	Ash.		Sulphate as (SO_3).	Chlorine (Cl).	Ammonia (NH_3).
ENGLAND.										
London—										
Meteorological Office	76	0·08	1·29	1·95	3·34	0·30	6·96	0·91	0·40	0·07
Embankment Gardens	51	0·13	2·31	7·41	2·79	4·44	17·08	2·94	0·62	0·12
Finsbury Park ...	48	0·14	2·22	9·44	0·77	3·15	15·73	1·60	0·35	0·08
Ravenscourt Park	56	0·03	0·56	1·79	2·39	2·76	7·53	1·59	0·38	0·08
Southwark Park	58	0·04	2·36	3·89	4·08	5·80	16·17	4·82	0·99	0·40
Victoria Park ...	46	Nil	0·19	0·78	0·69	2·32	3·97	1·57	0·37	0·21
Wandsworth Com.	34	0·07	1·36	0·79	1·35	2·88	6·45	1·63	0·49	0·09
Golden Lane ...	56	0·06	2·53	4·51	1·80	3·15	12·05	1·88	0·61	0·32
Malvern	74	Tr.	0·23	0·23	0·85	1·72	3·03	0·77	0·15	0·02
St. Helens...	23	0·05	0·08	3·46	1·18	2·65	7·42	1·05	0·50	0·01
Southport—										
Hesketh Park ...	36	0·01	0·18	0·58	0·79	2·35	3·91	0·94	0·20	0·04
Woodvale Moss...	32	—	—	—	—	—	3·55	—	—	—
SCOTLAND.										
Glasgow—										
Alexandra Park...	13	0·05	0·79	4·39	0·72	1·27	7·22	0·61	0·33	0·03
Bellahouston Pk.	16	0·04	1·40	3·01	0·48	1·57	6·50	0·87	0·10	0·06
Botanic Gdns. ...	20	0·09	1·60	3·97	0·93	2·27	8·86	1·28	0·19	Nil
Richmond Park...	16	0·08	1·99	4·11	0·75	2·12	9·05	0·92	0·63	0·08
Ruchill Park ...	25	0·06	1·08	4·13	0·67	1·48	7·42	1·12	0·11	0·07
South Side Park...	19	0·04	0·09	4·64	0·81	1·83	7·41	0·10	0·11	Nil
Tollcross Park ...	15	0·08	2·66	3·46	0·61	2·16	8·97	1·08	0·10	Tr.
Victoria Park ...	23	0·04	1·32	3·40	0·65	2·14	7·55	1·30	0·10	0·08

There were no returns during the month of June from the following stations: Victoria Park and Wandsworth Common (London); Manchester; Newcastle-on-Tyne; Rochdale; St. Helens. Lead was reported present in the deposit of all the Glasgow samples, and vegetable matter in the gauge at Bellahouston Park (Glasgow).

During July there were no returns from the following stations: Manchester (two stations); Newcastle-on-Tyne; Rochdale. At Blythswood Square (Glasgow) the volume of the sample was insufficient for complete analysis. The insoluble matter in the majority of the Glasgow deposits contained lead, and in the gauge at the Botanic Gardens of that city there was vegetable matter.

"Tar" includes all matter insoluble in water but soluble in CS_2. "Carbonaceous" includes all combustible matter insoluble in water and in CS_2. "Insoluble ash" includes all earthy matter, fuel, ash, &c. One metric ton per sq. kilometre is equivalent to: (*a*) Approx. 9 lb. per acre; (*b*) 2·56 English tons per sq. mile; (*c*) 1 g. per sq. metre; (*d*) 1/1000 mm. of rainfall. Tr. = Trace.

The personnel of public health authorities concerned in the supervision of these examinations and of the analytical work involved remains the same as published in previous tables. The analyses of the rain and deposit caught in the gauge at the Meteorological Office are made in THE LANCET Laboratory.

IRELAND.

(FROM OUR OWN CORRESPONDENTS.)

Registrar-General's Report.

THE report of the Registrar-General for Ireland for 1918 was issued last week. In some particulars the report is encouraging. The marriage-rate—5·15 marriages for 1000 of the population—is 0·34 above that for 1917, but 0·05 under the average for the ten years 1908–17. The birth-rate—19·9 per 1000—is 0·2 per 1000 above that for 1917, but 2·5 under that for the ten years 1908–17. The death-rate—18 per 1000—is 1·4 per 1000 above that for 1917, and 1·1 above that for the ten years 1908–17. The outstanding feature of the mortality statistics is the excessive mortality due to influenza and pneumonia. Deaths from influenza numbered 10,651 as against the average for ten years of 1234, and from pneumonia 6120 as against an average of 4067. The mortality from tuberculosis showed a slight fall. The rate was 2·19 per 1000, being 0·05 under the average for the previous ten years. The infant mortality was also less—86 per 1000 as against an average of 91.

The Dublin (83) General Hospital.

The members of the units which staffed the Dublin (83) General Hospital at Boulogne in 1917 and 1918 have held recently the first of what it is hoped to make a series of annual dinners, under the chairmanship of the organiser of the hospital, Colonel William Taylor, C.B. Of the 29 officers who served in the Dublin units one, Dr. Charles M. Benson, died early in 1919 of influenza. Twenty-three of the others attended the dinner, and renewed memories of a happy comradeship in France.

The Queen's University of Belfast.

The Vice-Chancellor's report for the session 1918–19 has just been published. There were 888 students enrolled—610 men and 278 women. 549 students (418 men and 131 women) were enrolled in the Faculty of Medicine—in other words, there were 210 more medical students than the combined number of students in all the other faculties. These figures demonstrate that the Queen's University of Belfast is largely becoming a medical university. Colonel T. Sinclair, C.B. (professor of surgery) was appointed registrar of the University and Representative on the General Medical Council.

Epidemic Disease in Belfast.

Belfast is still suffering from a widespread incidence of scarlatina, measles, mumps, and chicken-pox, exceeding in numbers all previous experience. Some attribute this unfortunate state of affairs to the crowded condition of the city, where in the working-class districts houses are so scarce that often two families reside in the ordinary accommodation for single families; while others believe the outbreaks to be due to the prolonged drought in summer and early autumn.

Jan. 6th.

NOTES FROM INDIA.

(FROM OUR OWN CORRESPONDENT.)

The War Work of the Indian Medical Service.

SINCE August, 1914, just short of 400 civil I.M.S. officers have been handed over to military authorities. During the war 71 were reverted from time to time, and since the termination of hostilities other reversions have taken place to fill essential billets on the civil side. But while the number of I.M.S. officers on the civil side before the outbreak of the war was over 500, there are now less than 200 on the civil cadre. Many of these, moreover, have been continuously at work for seven or eight years, and for the last five have been doing double work. The whole resources of the civil side of the service have been placed unreservedly at the disposal of the military authorities. The officers thus transferred from civil to military have supplied the nucleus round which the Indian Army has been able to build up an adequate corps of medical personnel. The trained war reserve thus constituted made it possible to maintain the medical services even when the Indian Army was so largely increased. Each regular I.M.S. officer has been practically a training centre for two or three temporary Indian I.M.S. officers who joined up during hostilities. The Indian Medical Service has gained one V.C., 59 M.C.'s, 46 D.S.O.'s, 8 C.B.'s, 23 C.M.G.'s, 41 C.I.E.'s, and 41 Orders of the British Empire of various grades. 533 I.M.S. officers have been mentioned in dispatches, 24 have gained foreign decorations, and 60 have been mentioned in the *Gazette of India* for services rendered in connexion with the war. The work of the I.M.S., both on the military and civil side, has been worthy of its highest traditions, and constitutes a record which any service in the Empire might well envy.

Instruction in Elementary Hygiene.

The efficient teaching of elementary hygiene in Indian schools would undoubtedly prove of great value to the community. It has been argued that a serious difficulty in the way of including hygiene in the curriculum is the apathy or inefficiency of the teaching staff. This argument may be pushed too far, just as the complete indifference of the people at large to measures for the prevention of disease has been exaggerated. A specific instance of what teachers may do to help the medical authorities is forthcoming in the notes on vaccination in the Central Provinces for 1918–19 by the Sanitary Commissioner, who remarks that it is a regrettable fact that although vaccination is a certain preventive of a deadly disease municipal committees are often so absorbed with petty affairs that they shut their eyes to the matter. In another part of the notes referring to the revaccination work done by the dispensary medical officers the Commissioner observes that "these medical officers brought to light many unvaccinated children, who were subsequently vaccinated with the help of the schoolmasters, most of whom render great help nowadays in the cause of vaccination." If the rising generation were properly instructed in health matters the municipal committees would in time be compelled to devote more attention to the prevention of disease.

Tuberculosis in Bombay.

The attention of the municipal corporation has been called by the executive health officer to the need for providing adequate hospital accommodation for tuberculous cases, including phthisis, among the poorer classes. The health officer estimates the number of attacks annually at 10,000, which is about five times the number of deaths from the disease. He points out that at any given time not less than 5000 are ill with tuberculous disease in Bombay, and proposes hospital accommodation with 200 beds for advanced cases.

Shillong Pasteur Institute.

The second annual report of the Shillong Pasteur Institute for the year ending December, 1918, has just been issued, and shows that 1068 patients underwent the complete course of treatment; of these, 90 were Europeans (including 7 Anglo-Indians) and 978 were Indians.

DEVON AND EXETER MEDICO-CHIRURGICAL SOCIETY.—A meeting was held at the Royal Devon and Exeter Hospital on Dec. 18th, 1919, the President, Dr. Ransom Pickard, in the chair. Mr. A. L. Candler read a paper on the Diagnosis and Treatment of Liver Abscess, based on cases personally met with on the Salonika and Mesopotamia fronts and during the recent operations on the North-Western Frontier of India. In the discussion which followed Dr. L. P. Black referred to cases under his care during the Gallipoli campaign of 1915. Dr. S. Steele-Perkins mentioned a case where persistent crepitations at the base of the right lung gave way to emetine injections. Dr. W. Gordon recounted three cases coming under his observation in which difficulties of diagnosis had arisen. In reply to several questions Mr. Candler urged the importance of an epigastric incision in cases where symptoms still pointed to an abscess in spite of a negative puncture.

Correspondence.

"Audi alteram partem."

THE JUSTIFIABILITY OF THERAPEUTIC LYING.

To the Editor of THE LANCET.

SIR,—In your issue of Dec. 27th, 1919, Dr. C. S. Myers, in the course of a violent denunciation of the treatment I adopted in the case of the patient with hysterical sleeping attacks (THE LANCET, Dec. 20th, 1919) uses strong language. Let me assure him that the principles of this treatment of 18 months ago differ in no way from those to which I would have consented in the case of similar illness in a member of my own family. Such a consideration, to my mind, will always be a reliable guide to any medical man who may have occasion to assess the motives which underlie his professional conduct. Further, I showed my patient and narrated the whole story of his illness to a medical gathering presided over by the President of the Royal College of Physicians of London. My considered opinion was, and is, that I did right in advising the patient to submit to the treatment, and I should like to express my appreciation of the support I received from the large body of my colleagues in circumstances which gave to their loyalty a special value.

Dr. Myers reiterates the word "needless" in referring to my procedure, yet he does not so much as outline his alternative treatment. The fear of failure of the remaining method of treatment known to the doctor (after consultation) should not weigh with him so long as there is a remote chance that it will benefit his patient, and, in my opinion, the risks to himself which the doctor may think likely to follow failure of a particular form of treatment are unworthy of any but passing consideration, provided that the requirement which I have mentioned is fulfilled. Risks have to be faced, and in this case the patient's future was at stake. He said that in the past he had been punished repeatedly for a disability over which he appeared to have no control, and it was in the hospital asylum, to which he had been sent with an erroneous diagnosis, that I found him. Deception in one of its many guises will probably continue to be used by some doctors for some cases as long as treatment of disease lasts, although it is a commonplace that the number of hysterical symptoms which appear to demand deception for their relief is every year becoming smaller. Frequently when an appeal to his reason has failed to cure a patient he has thanked me for giving him the chance of cure by an appeal to his imagination. He prefers a cure, however produced, to the alternative of discharge with his symptoms unrelieved.

When I decided to publish my paper I anticipated criticism and looked forward to it. The value of fair constructive criticism is beyond price, but I question the courtesy, to say the least, of the medical man who in the course of his criticism publicly asserts that in his opinion a fellow practitioner has adopted a procedure unworthy of his profession in the treatment of a patient.

Will you allow me to draw attention to a small mistake in my paper? On the last page "December, 1919" should read "December, *1918*."

I am, Sir, yours faithfully,

Harley-street, W., Jan. 3rd, 1920. HILDRED CARLILL.

THE DRAFT REGULATIONS FOR 1920.

To the Editor of THE LANCET.

SIR,—As Dr. H. B. Brackenbury, in his comments on my letter on this subject, says that almost every sentence which purports to be a statement of fact is either false or misleading, I must ask you for space for a reply. A conference that gives its approval to regulations which declare the decisions of the Minister to be final, that objects to an appeal to a court of law, that connives at the fact that the Minister may be both accuser and judge, that rejects clear-cut motions such as those from Stockport, Portsmouth, and Cheshire, and passes the as-you-were motion from Brighton, proclaims the Minister autocrat in the strictest sense of the term. "Speaking generally, what is resented more than anything else in the new regulations," says the *British Medical Journal*, "is the autocratic element which permeates them." Over and over again at the conferences objection was raised to the limitation of lists as curtailing the liberty of the medical man, interfering with his practice, and abrogating a first principle—free choice of doctor. Two years ago 70 areas voted for no limitations, as against 33 in favour of them. Yet the Bournemouth resolution to limit lists to 3000 was passed, although the chairman informed us that he had ruled out of order motions contrary to the decisions of the July conference. A further limitation to 2000 is a logical deduction.

I said a resolution to organise the profession to refuse service under certain contingencies was dropped as unthinkable. The minutes record that an amendment from York, "and instructs the Insurance Acts Committee to endeavour by all means to secure the refusal of all insurance practitioners to take service at any less sum" was lost. The reason given at the conference was that refusal was unthinkable; so to this day the Minister cannot make up his mind about the fee. If an insurance practitioner is responsible for all persons who have been accepted by him, for those who have left him and are perhaps out of benefit, but who have not been notified to him by the Committee as having ceased to be on his list, and for all accidents and emergencies pending their acceptance by somebody else, I say that he is at the beck and call, night and day, of anyone who can bluff him for treatment.

A practitioner shall not employ a permanent assistant to attend his insured patients without the previous consent of the Committee to the employment of such an assistant. The Committee is requested to be reasonable. Before consenting to the employment by a practitioner of more than one assistant the Committee shall obtain the approval of the Minister. In spite of these regulations the practitioner is after all responsible for all acts and omissions of any practitioner acting as his deputy or assistant. It is an old shibboleth that State money means State control. But in this case we have State control without State money.

I said that the patients whom a doctor attracts are not his but belong to the State. If the Minister confiscate Dr. Brackenbury's watch it belongs to the Minister as there is no appeal. The *British Medical Journal* has not minced words: "The Ministry of Health has stated its determination to alter the present regulations about transfers. Practitioners, for their part, are equally determined not to submit to any confiscation of the goodwill in their panel practices."

A pension scheme was literally sprung upon us a day or two before the conference. It was a red herring drawn across the trail. It was a daring move on the part of those who are out for a State service. It was resolved: "That this conference is in favour of a pension scheme for insurance practitioners to be managed by the practitioners themselves, and authorises the Insurance Acts Committee to negotiate with the Government concerning such a scheme." Resolved also: "That the question of a pension scheme for insurance practitioners be referred to local Medical and Panel Committees."

At the conference three names were added to the Association's nominees to form a deputation to the Minister. They had to inform him definitely that 13*s*. 6*d*. was the irreducible minimum that the profession would accept as a capitation fee. The interview with the Minister is published in the *British Medical Journal* of Dec. 13th. The usual arguments for better payment were advanced. That money had depreciated during the war, that the cost of living had increased, that more work meant more pay, that greater responsibility entailed greater consideration were theories new to him. His stereotyped reply reads: "That he could not see any case made out for any increased rate of remuneration."

The Ministry has taken the measure of our conference delegates. Our motions, whether passed or rejected, are entirely ignored at the Ministry. Since our conference the following most objectionable regulations were inserted in the latest draft regulations:—

"**Range of practitioners' duties.** (13) A practitioner is required (*a*) to furnish in writing to the medical officer any information which the latter may require with regard to the case of any patient to whom the practitioner has issued or declined to issue a medical certificate of incapacity for work; (*b*) to meet the medical officer, when the latter so requires, for the purpose of examining, in consultation, any patient in respect of whom the practitioner has sought the advice of the medical officer; (*c*) to afford to the medical officer, or to such other person as he may appoint for the purpose, access at all reasonable times to any records kept by the practitioner under these terms of service, and to furnish the medical officer with any such records, or with any necessary information with regard to any entry therein, as he may require; and (*d*) to answer any inquiries of the medical officer with regard to any prescription issued by the practitioner, or to any statement made in any report furnished by him under these terms of service."

Is it possible to consider insurance practice reputable after this? Fortune may render us unhappy; it is only ourselves that can make us despicable.

We were once medical practitioners. We were members of a learned profession. Now by the terms of our service we are insurance practitioners. We have, in the Commissioners' own words, to safeguard the interests of the approved societies. We are agents in a business undertaking. For heaven's sake, then, let us learn business methods.

I am, Sir, yours faithfully,

Exeter, Jan. 3rd, 1920. J. PEREIRA GRAY.

THE PREVENTION OF VENEREAL DISEASE.

To the Editor of THE LANCET.

SIR,—The statements made and the statistics quoted by Lord Sandhurst in the debate raised by Lord Willoughby de Broke in the House of Lords on Dec. 10th, and published in THE LANCET of Dec. 20th, 1919, are excessively misleading. It is possible or probable that Lord Sandhurst did not grasp the purport of Lord Willoughby de Broke's inquiry. The "Portsmouth area" to which Lord Willoughby de Broke alluded is that controlled by the Assistant Director Medical Services at Portsmouth. This officer had taken great care that sanitation, including sanitation with respect to venereal disease, should be taught to the troops in his charge. Lord Willoughby de Broke desired information as to the results of this teaching, but Lord Sandhurst supplied him with something quite different.

Within the area, during the period covered by the question and answer, were stationed American, Colonial, and R.F.C. units with which the A.D.M.S. had nothing to do. Moreover, there came into the area, to take up station, or on passage through it, drafts and whole units from elsewhere (e.g., other British areas and France) among whom were many men who had become infected before coming into the area and who developed disease after arrival. Lord Sandhurst—unknowingly, no doubt—apparently added together all the disease in the Portsmouth district, no matter by whom, or when, or where contracted, and gave the sum as an answer to Lord Willoughby de Broke. In actual fact, so far from "the Portsmouth area" being 2½ times worse than the average for the United Kingdom, it is probably the model area not only for the United Kingdom, but for the whole world, and not only for British troops but for all troops. Indeed, I think it will be found that, quite apart from American, Colonial, and R.F.C. units and from whole units arriving from elsewhere, the mere drafts joining station from other British areas supplied more disease than the whole resident military population. When the smallness of these drafts as compared with the resident population is taken into account the relative superiority of the Portsmouth area may be grasped. An instance drawn from actual fact will illustrate my meaning. A certain medical officer had seven cases of venereal disease among 2000 troops in two years and four months. One day 200 men arrived from the continent, and among them the first morning's parade revealed 21 cases of venereal disease. The M.O. was proud of his results, and credited himself with a disease-rate of 1·5 per 1000 per annum. But Lord Sandhurst's statistician would have credited him with a venereal-rate of $\frac{21 \times 365}{2} =$ 3832·5 per 1000 per annum.

Lord Sandhurst stated that in two hospitals about 12 per cent. of the venereal patients stated that they had disinfected themselves quickly. I can give him additional information. In a third hospital numbers of men stated that they had disinfected themselves immediately. But closer questioning revealed that none of them had done so. The first answer was caused by a fear of blame. 495 of Surgeon Commander Boyden's sailors disinfected themselves immediately, and not one took disease. The M.O. mentioned above, who had 2000 troops in charge, taught quick disinfection, and not one of his men who employed it contracted disease during the whole two years and four months.

Suppose two surgeons, each operating on hundreds of cases, and employing the same antiseptic methods, achieved widely different results—the one getting absolute immunity and the other many cases of infection. To what should we attribute the difference? I think every medical man would say the method was good, the patients not to blame, and the unsuccessful surgeon altogether to blame. Lord Sandhurst's statistician, calculating wholly from the results of the unsuccessful surgeon, would put the blame mainly on method. However, Lord Sandhurst states: "This showed that to be effective instructions as to use of disinfectants must be given much more clearly and insistently than had been the case in the army." Here we have the gist of the matter. But instructions are usually given clearly and insistently only by those who desire their success.

I am, Sir, your faithfully,

Southsea, Jan. 4th, 1920. G. ARCHDALL REID.

THE SERUM DIAGNOSIS OF SYPHILIS.

To the Editor of THE LANCET.

SIR,—I should like to congratulate Mr. D. C. Lewis on his lucid article on the Serum Diagnosis of Syphilis in THE LANCET of Jan. 3rd. The standardisation of the corpuscle suspension used in complement-fixation tests has always appeared to me to be of prime importance, and it is a matter for wonder that the Medical Research Committee in the pamphlet on standardisation of the Wassermann reaction does not so much as attempt a standardisation of what, after all, is the basal unit from which all other reagents are calculated. It is to be hoped, therefore, that Mr. Lewis's method or some modification of it will be generally adopted. The only criticism one can offer is that it adds to the laboriousness of an already somewhat cumbersome technique. This objection cannot, of course, stand in face of the obvious advantages. It only leads one to hope for some simpler method, and I should like to ask Mr. Lewis whether he has attempted to standardise by counting the red cells by means of a Thoma-Zeiss apparatus. It appears to me that this would involve less labour and could be done at room temperature. I have done very little work on this method as yet, but it does seem that, in this way, uniform suspensions of corpuscles can be obtained irrespective of the speed of the centrifuge, &c. Furthermore, as bearing out Mr. Lewis's statements, it is surprising what differences can be got in the number of corpuscles per c.cm. in so-called "3 per cent. suspensions" made up on different occasions. Controlling the rate and time of centrifugalisation does not seem to be a practical proposition, and some such method as Mr. Lewis's is imperative if any great degree of uniformity of results is to be obtained.—I am, Sir, yours faithfully,

C. FLETCHER.

Laboratories of Pathology and Public Health, Harley-street, W., Jan. 5th, 1920.

THE INSTABILITY OF ROUS-TURNER BLOOD SUSPENSIONS.

To the Editor of THE LANCET.

SIR,—We beg your permission to reply, as briefly as possible, to the letter in your issue of Dec. 13th, 1919, by Dr. Peyton Rous, who, we trust, will find no discourtesy in the condensation of our answer.

1. Our criticism was directed almost entirely against Professor J. S. C. Douglas and Dr. J. W. Bigger for the use they made of the suspensions, and in no way against Drs. Rous and J. R. Turner's main findings.

2. "Our conclusions are misstated," alleges Dr. Rous. But we wrote that Rous and Turner claimed no *noteworthy* change in the emulsions for three or four weeks. We did not say no change at all. By "noteworthy" we implied such changes as would render the emulsions unfit for accurate serological tests.

3. We drew the deduction from our saponin experiments that the emulsions undergo a progressive change of sensitiveness to serum hæmolysis. Dr. Rous considers this conclusion unjustifiable, and quotes the following authors in his support.

Professor H. G. Wells, in the chapter of his text-book which deals with the action of various hæmolysins, has collected a quantity of experimental evidence which shows that different hæmolysins may have different modes of action. We do not deny this; but we hold that text-book summaries should be used with much caution in criticism of detailed scientific observations. For text-books are never free from erroneous statements, nor is Professor Wells's book an exception—e.g., it is stated that saponin solutions are heat-resistant; whereas we have found that saline solutions of saponin are quickly weakened at 70° C., more slowly at lower temperatures, and even deteriorate spontaneously in a few days at room temperature.

McNiel's paper shows that jaundice may increase the resistance of red cells to hypotonic solutions, while diminishing their resistance to saponin.

Rywosch's work was with the blood of a variety of animals, some of which he showed to be highly sensitive to saponin but strongly resistant to hypotonicity, and vice versâ.

None of these data have any direct bearing upon our experiments and deduction. For we were concerned only with the actual changes taking place in a single blood emulsion, and we had no concern with different bloods nor even different emulsions of the same blood. Dr. Rous's quotations clearly do not prove that cells which increase in sensitiveness to saponin do not also change in sensitiveness to serum hæmolysin. There remains only Rous and Turner's statement that a skilled worker had found the preserved cells to be as serviceable for the Wassermann reaction as fresh cells. Dr. Rous tells us that this statement has been confirmed "in its essentials" by Reimann. Unfortunately, neither in Oxford nor from London's largest medical library have we been able to procure the journal containing his paper, and we are therefore at present not in a position to make any critical comments on this work. In any case, the Wassermann reaction is a relatively coarse and not truly quantitative test in which indeterminate variations in sensitiveness of the emulsions are constantly present. It is not capable therefore of deciding the point at issue.

4. The following facts seem to us to be quite clear and directly applicable to the matter in hand.

(*a*) Drs. Rous and Turner state that the emulsions undergo an increase in mechanical fragility during the period of preservation.

(*b*) We have demonstrated a progressive increase in sensitiveness to saponin.

(*c*) Dr. Bigger[1] has produced evidence of a similar increase towards serum hæmolysin (the actual point at issue). In the face of these findings we cannot admit that our deduction was in any way unreasonable. Upon those who deny its truth lies the burden of proof, that cells which undergo marked changes in sensitiveness to these various agencies none the less remain stable to serum hæmolysin in contradiction to Dr. Bigger's own subsequent findings. We adopted the best method we could devise for our experiments, in which the use of an absolutely stable substance—e.g., dry saponin—was essential. It is not at present possible to carry out a similar research with serum hæmolysin on account of its instability. If it had been possible we should have done it.

5. We did not use gelatin because its employment would have rendered our results incomparable with those of Douglas and Bigger, who did not make use of it.

6. Dr. Rous applies the phrase "an unusual lapse in accuracy for figures" to an observation of a purely qualitative nature which we chanced to make after our quantitative experiments had been concluded. The change in the red cells had by then reached such a pitch as to reveal itself at once even to casual inspection.

In conclusion, we trust that, even if we have failed to convince Dr. Rous himself that our saponin curves have (as we believe) a direct and fundamental bearing on the question of the stability of his emulsions, they may nevertheless prove of interest and assistance to those who are working on the lines of serological standardisation. We are, Sir, yours faithfully,

G. DREYER.
A. D. GARDNER.

Department of Pathology, University of Oxford,
Jan 5th, 1920.

[1] Jour. of Path. and Bact., May, 1919.

SUBCUTANEOUS EMPHYSEMA IN PARTURITION.

To the Editor of THE LANCET.

SIR,—Four nights ago I was called to a primipara, 20 years of age, who looked a healthy, well-developed woman, but had a small pelvis and a big child with the cord round its neck. Labour much prolonged, head three hours down on perineum, and pains decreasing in strength and frequency. Patient was lying on her left side; face, pushed down into the bed, was seen on raising to be much swollen on the right side, eye closed, bridge of nose broadened, swelling extending down side of face and neck. Patient complained of sore-throat (about thyroid) and difficulty in breathing. Was delivered with forceps. The following day her face was uniformly puffed up owing to change of posture; neck distended, and swelling extending down over thorax, giving everywhere the crackling sound and sensation of dry paper. There is now slight cough, but the swelling and sore-throat are subsiding. Examination by the stethoscope is unsatisfactory because of the subcutaneous crackling.

I send this as neither I nor two experienced practitioners of whom I inquired had met with this complication, nor do I find any reference to it in my midwifery text-books (save Galabin's)—Playfair, Jellett, and Eden; but Marcus Beck mentions it in Quain's Dictionary of Medicine upon the authority of Dr. Walshe, and I think it a matter of sufficient importance to the student to warrant its being dwelt upon by his lecturer in obstetrics. Besides, it may be of more frequent occurrence than I am aware.

I am, Sir, yours faithfully,

Kettering, Jan. 2nd, 1920. J. GOOD.

THE RIGHT USE OF THE COIN-CATCHER.

To the Editor of THE LANCET.

SIR,—In view of recent articles in THE LANCET advocating the use of the œsophagoscope and deprecating the use of the coin-catcher, I would like to point out that the coin-catcher used in conjunction and with the help of the X rays is not only a simple but also a harmless and efficacious instrument. During the ten months in 1918 when I was house surgeon to the Ear, Nose, and Throat Department of the London Hospital I on seven occasions removed coins or circular pieces of tin from the throats of small children who had swallowed them. These foreign bodies were always lodged at the same spot—i.e., at the level of the suprasternal notch. The children were generally aged from 3 years to 6 years, and the coins had been swallowed, as far as one could ascertain from their mothers, from one day to seven days prior to admission to hospital. Under

a light A.C.E. anæsthesia in the X ray room the whole procedure of introducing the coin-catcher and extracting the offending foreign body was easily and rapidly carried out. In no instance did the operation take more than three minutes, and always within 15 minutes from the time of leaving the children were back again in bed in the ward. They were kept in one night for observation and discharged the following day with no untoward symptoms supervening. To my mind this is an ideal way of dealing with these emergencies. The whole field of operation from start to finish is under visual control, thanks to the aid of the screen; if the coin-catcher is "hung up" on trying to extract the coin any temporary hitch is easily overcome by introducing it further down the œsophagus and then gently withdrawing it, and as long as care and gentleness are used no danger should be feared. On the other hand, the use of the œsophagoscope with a small child necessitates a deeper anæsthesia, a possibility of injuring the delicate structures at the back of the throat and sometimes sets up a fatal œdema of the glottis or a broncho-pneumonia. I saw two cases in which children died from broncho-pneumonia in 48 hours after the use of the osophagoscope for removal of coins, though both children were perfectly well (save for the presence of the swallowed coin) on admission.—I am, Sir, yours faithfully,

CHARLES H. CARROLL.

Lancaster-road, N.W., Dec. 31st, 1919.

THE ELSIE INGLIS MEMORIAL.

To the Editor of THE LANCET.

SIR,—In the annotation in your issue of Jan. 3rd one memorial seems to have escaped mention. I refer to the Elsie Inglis Memorial Chair in the Faculty of Medicine at the University of Belgrade. It owes its inception to the London Committee of the Scottish Women's Hospitals, and was inaugurated by a meeting at the Mansion House in June, 1918.

Thanks to the geographical position of our own land the material damage it sustained during the war was trifling, and the difficulties experienced in our medical schools and colleges are due to increased attendance, not to diminished accommodation. In Belgrade there has to be a material reconstruction of shell-shattered lecture-rooms and laboratories before any instruction can be given.

This association of Dr. Elsie Inglis's name with medical education, that she had so much at heart, and reconstruction of that country, in whose service she spent herself so unsparingly, even to the last moments of her life, seems a particularly happy one; it should commend itself to members of the medical profession in Britain, whose admiration for the courage and sympathy with the sufferings of our gallant ally have been already manifested in so many ways.

A substantial beginning has been made, but funds are still needed to complete the scheme, and may be sent to Lady Selborne, honorary secretary, Elsie Inglis London Memorial Fund, 16, Carlton House Terrace.

I am, Sir, yours faithfully,

LINA M. POTTER,
late Medical Officer to Russian Unit,
Kensington, W., Jan. 6th, 1920. Scottish Women's Hospital.

MYALGIC PAINS AND MANIPULATION.

To the Editor of THE LANCET.

SIR,—I have read the letter of "Non quis, sed quid" in your issue of Dec. 20th, 1919, with considerable interest. Cases such as he details are not uncommon, nor is the eventual result, to wit, cure at the hands of an irregular practitioner or "bone-setter" after failure on the part of the regularly qualified very uncommon either. Such cases are too numerous and too often vouched for either actually by medical men, or, if not, by individuals whose powers of scientific observation and criticism are beyond cavil, to be merely disregarded. That these things should be so is not very creditable to our profession. There can be no doubt that there is "something in" manipulative surgery the knowledge of which is not merely still undiffused through the profession, but of which even orthopædic surgeons have by no means a full knowledge.

The commonest type of case to be benefited by manipulative surgery is found among internal derangements of the knee-joint. There can be no doubt that many patients have gained stability and perfect restoration of function in the knee-joint by the agency of manipulative procedures, without recourse to any cutting operation. Occasionally such manipulations no doubt fail, but in that case no harm has been done as nothing in the manipulations prejudices the success of the arthrotomy which is still available. On the other hand, should an unsuccessful arthrotomy be performed, and this is an eventuality which is by no means unknown, the chances of a successful manipulation being performed subsequently are greatly lessened. While internal derangements of the knee-joint have constituted the most fruitful field in the past for the triumphs of manipulative surgery, there is no doubt also a class of case, to which that of "Non quis, sed quid" belongs, consisting of some obscure derangement of the tendons or articulations in the lumbar and sacro-iliac regions, which also provides a field for skilled manipulation.

I suggest that it is consonant with the dignity of the Royal College of Surgeons of England to appoint a small commission to inquire into manipulative surgery. The really expert practitioners of this art are not very numerous, and I cannot think that they would object to giving evidence and demonstrations before such a commission. It is up to the medical profession to give them the opportunity. It is no reproach to us that persons outside the profession should have discovered useful therapeutic methods, but it would be deplorable that we, because we are affected by prejudice, should fail to do our best to make such methods available to the whole of suffering humanity.

I am, Sir, yours faithfully,

Dec. 26th, 1919. HALDIN DAVIS, F.R.C.S. Eng.

"MIND AND ITS DISORDERS."

To the Editor of THE LANCET.

SIR,—May I put some points to the reviewer of Dr. W. H. B. Stoddart's book, "Mind and its Disorders," in THE LANCET of Dec. 20th? The "cortical paralysis" from "intraneuronic intoxication" mentioned by Dr. Stoddart is said to "go strangely" with the causes of maniac-depressive insanity, which the author of the book describes as "parental fixations and repressed homosexuality." At first sight this might appear so. But, of course, there are two possibilities that come at once to the mind, upon which I should like to hear opinions. The adoption of one or other of these possibilities as a working hypothesis will depend upon whether we try to subordinate classical views to Freudian ones, or whether we attempt to bring in psycho-analysis as a vassal to the older psychiatry. Suppose we consider the intraneuronic intoxication as the primary cause of the disease, then we know that as a result many psychic abnormalities make their appearance in the higher realms of thought and reason. The form these abnormalities take is the point of interest to the psychologist, and it may be assumed that whatever particular attitude of mind or character trait it was hardest for the individual to attain under the influence of his educational surroundings, that will be the first point of his psychology to give way under the stress of disease and cease being rationalised. Now, what are repressed homosexuality and parental fixations if not weak points in the individual's adapted mentality? In this case psycho-analysis would not be showing us the primary cause of the disease, but only the factors that determine the form of the symptomatic disorders.

If, on the other hand, we assume these repressions and fixations to be the fundamental cause of maniac-depressive insanity, we must inquire into the significance of the intraneuronic intoxication. Does or does not an organ which, as a result of functional disorder, exhibits excessive activity in certain directions and diminished action in others, so destroy its internal economy as to have its vitality and resisting powers lowered to the extent of offering a likelier footing for any possible toxæmia? If so, it might well be that the abnormal functionings consequent upon repressions and fixations lay the higher cerebral centres open to the

toxæmic changes that so frequently occur in the case of other organs as a result of lowered vitality and resistance.

At any rate, could it not be possible to reconcile the two points of view, rather than shutting oneself up in such a little world of one's own as debars one from accepting, let alone considering, views that are not in complete accordance with previously adopted hypotheses. I quite agree with the reviewer that it is to be regretted that Dr. Stoddart exemplifies so his views on symbolisms, especially as the book is addressed to students and general practitioners—that is, to a class of people that are probably totally unacquainted with the first and fundamental principles of psycho-analysis, and, indeed, may perhaps never have read such excellent books as have been published on sex symbolisms in religion, quite apart from analytical psychology.

I can see Dr. Stoddart smile, however, when he finds himself described as the possessor of an "unfortunate penchant for certain unpleasant phases of thought." So well does he know that a biased and instinctive dislike to a particular phase of thought is frequently but a reaction formation indicative of a personal difficulty in a similar phase of thought with subsequent repression on the part of the critic, that I am afraid that he will find additional support for the Freudian psychology in such undue criticisms.

I am, Sir, yours faithfully,

J. ERNEST NICOLE.

Kensington and Fulham General Hospital, Dec. 31st, 1919.

DIRECT INFECTION IN TUBERCULOSIS.

To the Editor of THE LANCET.

SIR,—I have been very much interested in Dr. E. Ward's interesting articles in THE LANCET on the above subject and the kindred one relating to conjugal tuberculosis. With almost all he says I am in complete accord, and I think we owe him a great debt for bringing this matter prominently before the profession at a time when such erroneous views are being ventilated with such confidence. I am, however, against regarding all cases of tuberculosis as infectious, and in his last article he has shown how foolishly the infectivity of some forms of tuberculosis can be exploited even by members of the medical profession. The question of infection is, of course, relative, and becomes almost negligible when reasonable precautions are taken, even in cases where there is abundant infective sputum; but if these precautions are omitted, as they will sure to be if the present erroneous views are further promulgated, infection is bound to follow. I would, however, remark that it is not necessarily from advanced cases that infection takes place, but often from unsuspected carriers. I remember some years ago admitting a patient whose sister had died of tubercular meningitis shortly before, and the family seemed to think that the one that had died had infected my patient. I discovered that until she was seized with head symptoms she had been in good health, but had been sleeping with my patient, who for some months had been attending the doctor for hoarseness; this was found to be due to tubercular laryngitis on admission, and events had happened as could have been foretold, the healthy girl being unprotected died of meningitis, a comparatively rare event in the course of chronic disease. This emphasises my contention that to eradicate tuberculosis the disease must be diagnosed much sooner and the cases treated in sanatoriums before they are hopeless.

I have during the last three months had four cases of well-marked tuberculosis occurring in married people. I have no doubt that infection may walk hand-in-hand with infection in many of these cases, and the seriousness of the result will depend upon the magnitude of the dose, the virulence of the bacilli, and the state of resistance of the recipient. The result being, as Dr. Ward points out, much worse in the case of a healthy previously uninfected partner.

I am, Sir, yours faithfully,

New Cumnock, Jan. 4th, 1920. EDWARD E. PREST.

Obituary.

SIR THOMAS RICHARD FRASER, M.D., F.R.C.P., LL.D. EDIN., LL.D. ABERD. AND GLASG., HON. SC.D. CAMB., HON. M.D. DUBL.,

EMERITUS PROFESSOR OF MATERIA MEDICA AND CLINICAL MEDICINE IN THE UNIVERSITY OF EDINBURGH, AND PHYSICIAN-IN-ORDINARY TO THE KING IN SCOTLAND.

WE much regret to announce the death of Sir Thomas Fraser, the veteran Professor of Materia Medica and Clinical Medicine at Edinburgh, who died on Jan. 4th at his residence, Drumsheugh Gardens, in the 79th year of his age.

Thomas Fraser was a Roxburghshire man, but his father had business relations with India, and the son was born in Calcutta in 1841. Educated in Edinburgh, he graduated in medicine at the age of 21 and immediately manifested the direction which his scientific abilities would take by obtaining the gold medal for his graduation thesis "On the Characters, Actions, and Therapeutic Uses of the Ordeal Bean" (Calabar bean, *Physostigma venenosum*). Further studies along this line, published in the *Natural History Magazine* of Edinburgh, the now defunct *Medical and Chirurgical Review*, and the Proceedings of the Royal Society of Edinburgh, were a prelude to his appointment first as assistant to Sir Robert Christison, the famous Professor of Materia Medica, and later, but at the early age of 28, as lecturer in his chosen subjects in the extra-mural school. This post he held for four years, and then, after a brief period of sanitary work in England, he was summoned back to Edinburgh in 1877 as Professor of Materia Medica in succession to Christison. From this time forward he became one of the leading pharmacologists in the country, and, indeed, in the world, and his work in association with Christison, Crum Brown, Lauder Brunton, William Roberts, and later Cushny and Elliot, has done much to secure the transformation of the drug treatment of disease from empiricism to scientific routine.

To these men, and others like Magendie and Bichat, medicine owes an unpayable debt, and in an address delivered before the Section of Pharmacology and Therapeutics at the meeting of the British Association held in Cardiff in 1885 Fraser gave a remarkable exposition of the aims of the coming pharmacology. The change in direction of pharmacological studies was indicated by his statement that he regarded pharmacology as one of the means by which the great aim of medicine, the healing of disease, could be reached, adding that as the use of drugs was one of the essential means for healing, so it therefore became of importance to arrive at a clear conception of the methods by which the investigation of pharmacological problems could be effected. This was the note of all his future work. It meant the substitution for the old-fashioned methods, whereby the action of remedies was studied through their administration in disease, of a newer science in which, the essential nature of the pathological process having been defined, accurate biological and chemical knowledge was employed to produce the substance which ought to deal with the perverted process. This application of pharmacological knowledge to the cure of disease, a problem entirely separated from that of determining the action of remedies, was illustrated by his earliest work in connexion with physostigmine, its relations to atropine, and their uses in ophthalmic procedure; his next big research into the properties of strophanthus had a similar scope. For an important publication now followed, in which he demonstrated the diuretic powers of this new drug, showing how these had been discovered and could be utilised as a cardiac remedy. An investigation of "kombé," the arrow poison of certain African tribes, revealed the plant to yield an active principle, strophanthin, and Fraser proved by experiments that this crystalline substance was in physiological action allied to digitalin and other members of the digitalis group. This discovery he set out in a paper, published

in the *British Medical Journal*, which literally bristled with records of past work and notes on recent experiments, and put out all that was then known of the actions and uses of digitalis and of its substitutes, with special reference to strophanthus. The paper was recognised on all sides to be an example of the best kind of practical investigation in therapeutics, and it has formed a pattern for similar researches in many instances.

During the next decade similar practical work followed from Fraser's researches, papers on the use of nitrites in the dyspnœa of asthma and bronchitis, on the relative value of opium, morphine, and codeine in diabetes, on bichromate of potassium as a remedy in gastric affections, and on bone marrow in the treatment of pernicious anæmia being published in the *British Medical Journal*, THE LANCET, and the Transactions of the Medico-Chirurgical Society of Edinburgh. But practical progress along these lines was hampered in rather a curious manner by actual developments in chemical knowledge. This Fraser pointed out in an address delivered at the medical graduation ceremonial at Edinburgh in 1894, and published in THE LANCET. He then said that in his department of therapeutics shallow pretentions had for centuries been rife and were now being more boldly advanced than ever, with the knowledge that suffering humanity, being naturally anxious for relief, was prone to credit dogmatic assertions, especially if accompanied with a misuse of scientific phraseology. His words were a distinct warning to all that the recent advances in organic chemistry, which had led to the discovery of an unlimited number of complex substances with possible physiological actions, had brought with them temptations to charlatanism. He considered that medical men, as well as commercial chemists, were advocating the use for all sorts and conditions of disease of remedies to which no proper trial could be given, and pointed out that the determination of the physiological action of any substance, organic or inorganic, might require at least six months' study by a skilled investigator. The warning was timely and came from the right lips.

One particular direction of Fraser's work requires further mention—namely, his investigations into snake-poisoning. His researches into the action of snake-poisoning, especially the poison of the cobra, were largely made in association with Lauder Brunton and in continuation of the labours of the late Sir Joseph Fayrer, while later and in association with Major R. H. Elliot he gave the medical profession such exact knowledge as it possesses of the effect upon the cardiac action of cobra venom. Fraser and Elliot discovered that different venoms differ greatly as regards their degree of toxicity, and that the minimal lethal dose of any given venom varies somewhat for different animals, weight for weight. The animals employed were rats, rabbits, and cats, and it was found that the venom of the sea-snake produced totally different experimental results from those produced by cobra poisoning. The actions of venoms upon the circulation and the heart, previously noted by Brunton and Fayrer, were next completely studied by Fraser in collaboration with Elliot, and the result of this work was to indicate the complexity of venom substances and the variety of symptoms produced according to the amount of venom injected and the site of the injection. It was obvious, therefore, that any attempt to remove and destroy the venom deposited locally might have to be founded upon the endeavour to neutralise the poison absorbed into the general circulation, inasmuch as the attempt to deal with the injury at its site, by ligature or cautery, would be bound to fail unless put in action with an impossible promptitude. A serum treatment for snake-poisoning was thus clearly indicated, and here Calmette and Fraser were the pioneers. In 1894 Calmette published an account of extended researches into the production of immunity against snake venom among animals subjected to experimental injection. In 1895 Fraser published his account of the antidotal properties of the blood serum of immunised animals and of venomous serpents, and in the following year a paper in the *British Medical Journal* from his pen carried the subject on further, when he pointed out the limitations of the antidotal powers of antitoxin as illustrated in the antagonism between antivenene and snake venom.

In 1898 the prevalence of plague in India led to the sending out of a Scientific Commission to inquire into the cause of the epidemic, the conditions of the spread, and the methods of prevention that might be taken. Fraser was selected to act as chairman of the Commission and proceeded for a year to India in this capacity. The work of the Commission has been recognised as adding largely to our knowledge of the propagation and prevention of plague. His appointment was a public recognition of his position as clinician as well as pharmacologist, for all his work was done with appreciation of the intimate relations that must exist between therapeutics, where he was a discoverer, and clinical medicine, where in his capacity of physician to the Royal Infirmary he was an assiduous officer and successful teacher. He was, moreover, actively interested in the cause of medical education. Dean of the Faculty of Medicine of the University for a long period, he was examiner in materia medica and public health at the University of London, and in materia medica at his own University, which he also represented for some years on the General Medical Council.

The respect in which he was held is indicated by the academic honours which he received. He was a Fellow of the Royal Society, five great British universities presented him with honorary degrees, and he was also a Fellow of the Academy of Medicine of Turin and of the Philadelphia College of Physicians. He succeeded Sir William Gairdner as honorary physician to the King in Scotland, and duly received the honour of knighthood. He carried on his work as professor at the University, in spite of failing health, until the summer of 1918, when he was succeeded in the chair of Materia Medica by Professor A. R. Cushny. On his retirement the University of Edinburgh bestowed upon him the honorary degree of LL.D., and at the same time he was presented with his portrait. Alike as discoverer, teacher, and organiser, Fraser has left an abiding mark, not only upon his famous University, but upon the medical history of the country.

Sir Thomas Fraser married Susanna, daughter of the Rev. R. Duncan, by whom he had a large family. Of this the war took heavy toll, for one of his sons was killed in France and one perished in the foundering of a submarine, while a husband of one of his daughters was also killed and another son wounded. One of his surviving sons, a well-known physician in New York, accompanied the American army to France and is at present with the army on the Rhine.

GEORGE CARTER LOWE, F.R.C.V.S., M.R.C.S. ENG.

IN THE LANCET of Dec. 27th, 1919, appeared an obituary notice of Dr. Arthur Rieussett Litteljohn, who, after upbringing as a veterinary surgeon, turned to human medicine and became a valued official in the medical department of the Local Government Board. Dr. George Carter Lowe, who died on Dec. 9th, also belonged to that small band of clinicians qualified to treat both man and beast. He was born in Bermondsey in 1869, the son of a well-known veterinary surgeon with an extensive practice in Bermondsey and Southwark. After an education at the St. Olave's Grammar School he entered as veterinary student at the Royal College in 1887, qualifying M.R.C.V.S. in 1892, and after his father's death continued his practice at Oxley-street, Bermondsey. In 1906 he took his F.R.C.V.S. with a thesis on "Periarticular Ringbone in the Horse." Just previous to this he entered Guy's Hospital as a medical student, and obtained the qualification of the Conjoint Board in 1911. Dr. George Lowe then joined the partnership of Drs. Salter, Richmond, Stratton, and Goldie, and practised in Bermondsey until his death. He was doing full work up to Dec. 6th, on the evening of which he complained of a sore throat. The next day he was found to be suffering from suppurative tonsillitis with septic faucitis, which developed into general septicæmia, death occurring quite suddenly on the evening of Dec. 9th. His remains were cremated at Golders Green on Dec. 12th.

Dr. Lowe identified himself with the social life of the community to whose physical needs he ministered. He was president of the Bermondsey Adult School and treasurer of the Independent Labour Party. His good works were done by stealth, and his best memorial is a fragrant memory in a district where life is drab.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Temp. Surg.-Lieuts. L. W. Gemmell and D. A. P. Clarke are transferred to the permanent list of Surgeon-Lieutenants.

ARMY MEDICAL SERVICE.

Col. G. Dansey-Browning is placed on the half-pay list.

Temp. Col. E. F. Buzzard (Captain, R.A.M.C.T.F.) relinquishes his temporary commission on re-posting.

ROYAL ARMY MEDICAL CORPS.

Lieut.-Col. C. J. O'Gorman relinquishes the temporary rank of Colonel.

The undermentioned relinquish the acting rank of Lieutenant-Colonel: Majors C. W. Bowle, E. D. Caddell, E. L. Moss, G. H. Stevenson; Temp. Capt. L. D. Shaw.

Temp. Capt. E. Biddle relinquishes the acting rank of Major.

The undermentioned Captains are seconded for service with the Egyptian Army: (Bt. Major) W. E. Marshall, J. Biggam, K. P. Mackenzie.

Major W. M. Power, from the half-pay list, retires on retired pay on account of ill-health.

Capt. G. S. Parkinson to be temporary Major whilst specially employed.

H. E. L. Canney, late temporary Major, to be temporary Major.

Late temporary Captains to be temporary Captains: G. Fleming, J. N. G. W. McMorris, A. Vella.

Temp. Capt. J. Higgins to be Captain.

The undermentioned Lieutenants (temporary Captains) to be Captains: W. E. Hodgins, T. S. Law.

Temp. Lieut. J. A. P. Cullen to be temporary Captain.

Lieut. E. H. W. Elkington, from Can. A.M.C., to be Lieutenant and to be temporary Captain.

W. H. Steavenson to be temporary Lieutenant.

Officers relinquishing their commissions: Temp. Hon. Lieut.-Col. M. Gamble (and retains his honorary rank). Temp. Capts. A. Anderson, (acting Major) F. G. W. Deane (granted the rank of Lieutenant-Colonel). Temporary Captains granted the rank of Major: A. S. K. Anderson, J. B. Haycraft, F. De S. McMenamin, W. Martin, E. McCulloch, E. G. Dingley, G. R. B. Purce, G. W. R. Rudkin, M. Bates, J. S. Doyle, D. B. Pascall. Temporary Captains retaining the rank of Captain: A. Renshaw, W. E. Hopkins, F. J. Strachan, E. Grey, A. J. Will, R. Thomson, N. S. Sherrard, J. D. Wright, R. H. Thomson, R. Ward, H. A. Ash, H. L. Flint, J. C. McWalter, R. S. Harvey, W. J. Poole, C. E. Sharp, O. R. Allison, J. C. Robb, H. G. Oliver, D. Malloch, J. P. Dee, D. L. Spence, W. Howat, A. R. Moore, A. E. Foerster, J. H. D. Phelps, D. Denlop, J. Menzies, S. E. Y. Elliott, H. Mortimer, R. A. Fuller, G. Habgood, N. H. Smith, V. M. Coates, F. Newey, H. J. Burke, C. G. Harmer, L. Hutchinson, A. Gregory, J. F. Allan, P. S. Marshall, V. St. L. Pinnock, W. T. Currie, J. H. Murray, R. W. Murphy, E. T. Glenny, J. A. MacArthur, T. Forsyth, J. Paxton, B. P. Parmiter, L. M. Mayers, A. L. E. F. Coleman, E. Morison, N. Reader, B. J. Cusack, S. Murray, J. Dunlop, L. W. Bain, W. J. Macdonald, H. Richmond, A. E. Schokman, R. McLean, J. A. P. Cullen, S. P. Rowlands, I. C. MacKenzie, J. Porter, J. I. Enright, J. Avery, S. J. Darke, T. W. Bayne, H. P. Fairlie, J. D. MacEwen, J. C. Knox, D. S. Campbell, R. M. McMinn, R. Brown, W. L. Cassells, S. P. Stoker, S. A. Furlong, P. D. Magowan. Temp. Lieut. P. J. F. Lynch (and retains the rank of Lieutenant).

TERRITORIAL FORCE.

Lieut.-Col. W. B. Mackay relinquishes his commission on account of ill-health contracted on active service, and retains the rank of Lieutenant-Colonel.

Major (acting Lieut.-Col.) W. A. Thompson, Capt. (acting Lieut.-Col.) F. G. Dobson, Capts. (acting Majors) L. N. Reece, D. C. Bremner, J. Everidge, F. W. K. Tough, and A. P. Thomson relinquish their acting rank on ceasing to be specially employed.

Capt. F. Ellis relinquishes his commission on account of ill-health caused by wounds, and is granted the rank of Major.

1st London Sanitary Company: Lieut. J. T. A. Walker to be Captain.

1st Northern General Hospital: Capt. N. Hodgson is restored to the establishment.

SPECIAL RESERVE OF OFFICERS.

Capt. J. B. Hanna relinquishes the acting rank of Major.

The undermentioned Lieutenants to be Captains: W. E. P. Briggs, G. Winter, G. S. Lewis, W. Oats.

ROYAL AIR FORCE.

Medical Branch.—The undermentioned are transferred to the unemployed list: Capts. W. L. Scott, R. W. Meller, J. E. Lascelles, L. A. Walker, H. Y. Riddell, C. H. Browne, and (acting Major) L. C. McL. Wedderburn.

Dental Branch.—Capt. N. H. Medhurst is transferred to unemployed list.

INDIA AND THE INDIAN MEDICAL SERVICE.

Major-Gen. G. G. Giffard, Surgeon-General to the Government of Madras, has been appointed Honorary Surgeon to the King-Emperor. Lieut.-Col. A. W. T. Buist has made over charge of the duties of Superintendent of the District Jail at Rawalpindi to Raj Sahib Lalla Gopal Das, officiating Civil Surgeon, Rawalpindi. Lieut.-Col. J. Stephenson, Principal, Government College, Lahore, has been granted one year's leave preparatory to retirement. Major W. D. Overbeck Wright is permanently posted to the United Provinces. Lieut.-Col. J. C. H. Leicester is officiating as Professor of Midwifery, Medical College, Calcutta. Dr. Baij Nath Vyas Rai Bahadur, Civil Surgeon, on special duty, is to hold civil medical charge of the Morabad District, in addition to his own duties, vice Major H. P. Cook, I.M.S., Civil Surgeon, who has been granted leave. The local Government has nominated Lieut.-Col. W. H. E. Woodwright officiating Inspector-General of Civil Hospitals, United Provinces, to be President of the United Provinces Medical Council, vice Col. C. Mactaggart, resigned. The Viceroy has selected Col. J. K. Close, officiating Surgeon-General with the Government of Bengal, for the appointment of Inspector-General of Civil Hospitals, United Provinces, in succession to Col. C. Mactaggart, who has proceeded on leave preparatory to retirement. Col. Close has spent many years of his service in the United Provinces, and his appointment will be cordially approved by all acquainted with his professional zeal.

URBAN VITAL STATISTICS.

(Week ended Jan. 3rd, 1920.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at 16,500,000 persons, the annual rate of mortality, which had been 13·9, 14·6, and 12·0 in the three preceding weeks, rose to 16·2 per 1000. In London, with a population slightly exceeding 4,000,000 persons, the annual death-rate was 17·0, or 6·4 per 1000 above that recorded in the previous week, while among the remaining towns the rates ranged from 7·0 in Eastbourne, 8·8 in Wimbledon, and 9·1 in Aberdare, to 22·6 in Hastings, 22·7 in West Hartlepool, and 27·2 in Bury. The principal epidemic diseases caused 358 deaths, which corresponded to an annual rate of 1·1 per 1000, and comprised 111 from measles, 93 from diphtheria, 72 from whooping-cough, 55 from infantile diarrhœa, 21 from scarlet fever, and 6 from enteric fever. Measles caused a death-rate of 1·4 in Liverpool, 1·5 in Preston, 1·7 in Plymouth and in Darlington, and 2·3 in Grimsby and in Bootle; whooping-cough of 1·4 in Norwich, 1·6 in Grimsby, and 2·0 in Aberdare; and diphtheria of 1·1 in Nottingham and in Swansea, 1·2 in Tottenham and in East Ham, and 1·3 in York. The 52 deaths from influenza were 9 in excess of the number in the previous week, and included 19 in London and 4 in Salford. There were 2926 cases of scarlet fever and 1873 of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, against 2873 and 1862 respectively at the end of the previous week. The causes of 47 deaths in the 96 towns were uncertified, and included 7 in Birmingham, 6 in London, 4 in Liverpool, and 3 in Gateshead.

Scotch Towns.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual rate of mortality, which had been 13·5, 13·2, and 14·8 in the three preceding weeks, rose to 15·9 per 1000. The 328 deaths in Glasgow corresponded to an annual rate of 15·3 per 1000, and included 8 from diphtheria, 7 from infantile diarrhœa, 5 from whooping-cough, 2 from measles, and 1 from scarlet fever. The 97 deaths in Edinburgh were equal to a rate of 15·0 per 1000, and included 3 from diphtheria and 2 from scarlet fever.

Irish Towns.—The 155 deaths in Dublin corresponded to an annual rate of 20·0, or 8·2 per 1000 above that recorded in the previous week, and included 4 from infantile diarrhœa, 2 from whooping-cough, and 1 each from enteric fever, measles, and diphtheria. The 197 deaths in Belfast were equal to a rate of 25·6 per 1000, and included 26 from measles, 8 from scarlet fever, 4 from infantile diarrhœa, 3 from enteric fever, and 1 each from whooping-cough and diphtheria.

Medical News.

UNIVERSITY OF CAMBRIDGE: DIPLOMA IN RADIOLOGY AND ELECTROLOGY.—Courses of lectures and practical work in Part I. (*a* and *b*) will be given at the Cavendish Laboratory, Cambridge, by Mr. J. A. Crowther, beginning Jan. 20th. Courses of lectures in Part II. (*b*) will be given in the Medical Schools, Cambridge, beginning Jan. 19th, by Dr. E. P. Cumberbatch (St. Bartholomew's Hospital), Dr. C. E. Iredell (Guy's Hospital), Dr. F. Shillington Scales (Cambridge), Dr. W. J. Turrell (Oxford), and Dr. R. S. Woods (London Hospital), as far as at present arranged. Application for attendance at these courses should be made to Dr. F. Shillington Scales, Medical Schools, Cambridge. The following hospitals are recognised by the University of Cambridge for clinical instruction in the Radiological and Electrical Department: Addenbrooke's, Cambridge; Charing Cross; Guy's; King's College; London; Middlesex; St. Bartholomew's; St. George's; St. Mary's; St. Thomas's; University College; Westminster; Royal Free; Cancer Hospital (Brompton); Hospital for Consumption (Brompton). The date of the next examination, to be held at Cambridge, has been provisionally fixed for July, 1920. Similar courses in Parts I. and II., recognised by the University of Cambridge, will be given in London, where application should be made to Dr. Robert Knox, 38, Harley-street, W.

UNIVERSITY OF LONDON.—At a meeting of the Senate on Dec. 17th last, Dr. Sydney Russell Wells was elected Vice-Chancellor for the remainder of the year 1919–20, in the place of Sir Cooper Perry, who has been appointed Principal. Professor William Bulloch, F.R.S., was appointed as from Jan. 1st the first occupant of the newly established Goldsmiths' Company's chair of Bacteriology tenable at the London Hospital Medical College. The Senate invite applications for the University chair of Pathology tenable at the Middlesex Hospital Medical School. The salary will be £800 a year. Applications, accompanied by copies of not more than three testimonials and the names of not more than three persons to whom reference may be made, should be received not later than the first post on Tuesday, Jan. 27th, at the University, South Kensington, S.W. 7, by the Academic Registrar, from whom further particulars may be obtained. Twelve copies of all documents must be furnished, and envelopes should be marked "Chair of Pathology." An additional First Examination for Medical Degrees will be held in March, commencing on Monday, the 22nd. Applications for forms of entry must be made to the Academic Registrar, at the University, before Feb. 18th.

Advanced Lectures in Physiology.—The following courses of Advanced Lectures in Physiology, recognised by the University of London as advanced lectures which a candidate at the B.Sc. Honours Examination may name for part of his examination, have been arranged for the second term of the session 1919–20: (1) "Physiologically Balanced Solutions," eight lectures by Mr. W. L. Symes, M.R.C.S., in the Physiological Laboratory of the University, South Kensington, on Tuesdays, at 5 P.M., beginning on Jan. 27th. (2) "The Reaction of the Blood and Acidosis," eight lectures by Dr. J. W. Trevan, at St. Bartholomew's Hospital, on Wednesdays, at 4.30 P.M., beginning on Jan. 28th. (3) "The Regulation of Respiration," eight lectures by Dr. M. S. Pembrey and Dr. J. H. Ryffel, at Guy's Hospital, on Thursdays, at 4.30 P.M., beginning on Jan. 8th. These courses of lectures are addressed to advanced students of the University and to others interested in the subjects dealt with, and admission is free, without ticket.

THE next annual congress of the Ophthalmological Society of the United Kingdom will be held on Thursday, Friday, and Saturday, April 29th and 30th, and May 1st, 1920, under the presidency of Mr. J. B. Story. The arrangements include meetings at the Royal Society of Medicine, 1, Wimpole-street, London, at the Royal London Ophthalmic Hospital, City-road, E.C., and at St. Margaret's Hospital, Leighton-road, N.W., the special hospital of the Metropolitan Asylums Board for cases of ophthalmic neonatorum. Among the subjects to be discussed are "Diabetes in Relation to Diseases of the Eye," and "The Prevention and Treatment of Ophthalmia Neonatorum," and members desirous of reading papers, showing cases, or taking part in the discussions, are requested to communicate as soon as possible with Mr. F. A. Juler, 24, Cavendish-square, London, W. 1. Papers and communications, subject to the judgment of the council, will be printed in full in the Transactions. Members are reminded that under the by-laws papers must not exceed 20 minutes in length and subsequent speeches 10 minutes, and that all communications must be typewritten.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—Six Hunterian lectures on John Hunter's Observations and Discoveries in Anatomy and Surgery, illustrated by his specimens and preparations, will be delivered in the theatre of the College in Lincoln's Inn-fields, by Professor Arthur Keith, Conservator of the Museum, at 5 P.M. on each of the days mentioned:—I., Monday, Jan. 19th: His Contributions to Our Knowledge of the Heart and Blood-vessels. II., Wednesday, Jan. 21st: His Contributions to Our Knowledge of the Lungs and Pleuræ. III., Friday, Jan. 23rd: His Contributions to Our Knowledge of the Alimentary System. IV., Monday, Jan. 26th: His Contributions to Our Knowledge of the Kidneys, Bladder, and Urethra, and Diseases Connected with these Structures. V., Wednesday, Jan. 28th: His Contributions to Our Knowledge of the Genital and Reproductive Systems. VI., Friday, Jan. 30th: His Contributions to Our Knowledge of the Eye, Ear, and Nose.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.—A clinical meeting will be held to-day (Friday, Jan. 9th), at 8 P.M., in the society's rooms, West London Hospital, when Mr. W. H. Trethowan will show Six Cases of Bone Graft (from the Shepherd's Bush Special Surgical Hospital).

ROYAL INSTITUTION.—On Tuesday next (Jan. 13th), at 3 P.M., Sir Johan Cadman will deliver the first of two lectures at the Royal Institution on (1) Modern Development of the Miner's Safety Lamp; (2) Petroleum and the War. The Friday evening discourse on Jan. 16th at 9 o'clock will be delivered by Sir James Dewar on Low Temperature Studies, and on Jan. 23rd by the Hon. Sir Charles Parsons on Researches at High Pressures and Temperatures.

THE TUBERCULOSIS SOCIETY.—The adjourned joint meeting of this society and the Association of School Medical Officers will be held on Monday, Jan. 12th, at the rooms of the Medical Society of London, 11, Chandos-street, W., at 7.30 P.M., when the discussion on the Various Aspects of Tuberculosis as Affecting Child Life will be resumed by Dr. F. W. Higgs, Dr. Letitia Fairfield, Dr. Jane Walker, Dr. J. Watt, and others.—On Jan. 19th, at 8 P.M., Sir Henry Gauvain will read a paper on Surgical Tuberculosis from the Point of View of the Tuberculosis Officer.

SCOTTISH OTOLOGICAL AND LARYNGOLOGICAL SOCIETY.—The society met in the Western Infirmary, Glasgow, on Dec 13th, 1919, the President, Dr. W. T. Gardiner, in the chair. The President showed a patient with total deafness associated with vertigo; the vertigo preceded the deafness by three weeks, the deafness coming on suddenly. Dr. R. P. Mathers showed an ex-soldier suffering from stenosis of the trachea following a bullet wound. Dr. A. A. Gray gave a demonstration illustrating the comparative anatomy of the membranous labyrinth. Dr. W. S. Syme showed a man whose larynx he had removed nearly two years ago for malignant disease; there had been no recurrence, and the man had developed a good pharyngeal voice. Dr. James Adam showed a woman with a growth of the hypopharynx of 13 years' duration, which had twice disappeared under radium and recurred. He also raised the question whether, in all cases of purulent rhinitis in children which fail to respond to a few months of ordinary treatment, the maxillary, like the mastoid antrum, should be explored. A discussion followed, which it was decided to continue at a future meeting. Dr. Kerr Love read a short paper on electrical aids to hearing, based on an experiment in the case of 70 deaf children.

THE MENTAL HOSPITAL SERVICE OF THE LONDON COUNTY COUNCIL.—The London County Council invite applications from qualified medical men for the appointments of fifth and sixth assistant medical officers in the London County Mental Hospital Service. There are vacancies at present for fifth assistant medical officers at Banstead Mental Hospital, Banstead, Surrey; Cane Hill Mental Hospital, Coulsdon, Surrey; Long Grove Mental Hospital, Epsom, Surrey; and for sixth assistant medical officers at Banstead Mental Hospital; Bexley Mental Hospital, Bexley, Kent; Cane Hill Mental Hospital; Claybury Mental Hospital, Woodford Bridge, Essex; Colney Hatch Mental Hospital, New Southgate, N.; Hanwell Mental Hospital, Hanwell, W.; Long Grove Mental Hospital. The remuneration attached to each appointment is at the rate of £300 a year, rising by £25 a year to £400 a year, and war bonus and a percentage addition have been granted by the Council, amounting to from £130 to £153 a year in addition to the scale salary. The question of the continuation or otherwise of the grant is under consideration by the Council. The appointments are pensionable. Candidates should not exceed 35 years of age. Forms of application, containing particulars of other conditions of appointment, can be obtained from the Asylums Officer, London County Council, 13, Arundel-street, Strand, London, W.C. 2, to whom a stamped addressed foolscap envelope should be sent for reply.

Mr. Joseph Watson, of Wetherby, has given £50,000 to the Leeds General Infirmary as a New Year's gift, on condition that the sum of £10,000 shall be invested and the proceeds devoted to a nurses' pension fund.

HUMANISED MILK AND PROFITEERING.—Recently at Exeter a local dairy was brought before the Profiteering Committee for charging 1*s.* 6*d.* per pint for humanised milk. The committee decided the charge was too much, and ordered that 3*d.* per pint should be refunded.

BATH PENSIONS HOSPITAL.—The Bath War Hospital has been acquired by the Ministry of Pensions for the treatment of discharged and disabled soldiers. The institution will be a centre for the treatment of disabled pensioners, and is to be known as the Bath Pensions Hospital. The commandant will be Lieutenant-Colonel Milne Thompson.

BRISTOL MEDICAL CHARITIES.—The voluntary medical institutions of the city are faced by considerable financial difficulties. In the local press the secretary to the Royal Infirmary points out the great increase in the cost of equipment; the secretary to the General Hospital, which is usually regarded as holding the soundest financial position of all the hospitals, says that the adverse balance is not far short of £10,000; while the Bristol Dispensary is also in great difficulties. The Children's and Eye Hospitals are believed to be contemplating rebuilding or extension schemes. Having regard to these conditions and the urgent need for improvement in many aspects of hospital work, the Lord Mayor of Bristol has decided to consider the hospital problem as a whole. There is reason to believe that this decision will meet with a cordial welcome from the various institutions, whose administrative and medical staffs are anxious to find some means of enhancing efficiency by coöperation.

ST. GEORGE'S HOSPITAL.—Dr. Robert Donaldson, F.R.C.S., D.P.H., pathologist and bacteriologist to the Royal Berkshire Hospital, has been appointed pathologist and curator of the museum at St. George's Hospital. This appointment was held by the late Dr. R. Salusbury Trevor, and since he died the work of the curator has been carried on by Miss Helen Ingleby, M.R.C.P., and Sir Humphry Rolleston, K.C.B., has been supervising the pathological laboratory as an honorary duty. The combined post will now be filled by Dr. Donaldson, who during the war was bacteriological specialist to the war hospital laboratory at Reading.

PRESENTATION TO A MEDICAL MAN.—An interesting ceremony recently took place at the Norfolk War Hospital (which has now resumed its normal function as the Norfolk County Asylum), when a presentation was made to Dr. David Thomson, C.B.E., by the permanent heads of departments of the hospital. The presentation, consisting of an illuminated address and an aneroid barometer, was made by the matron, Miss Hamer, as senior officer, in a felicitous little speech, in which she expressed the confidence felt by all the members of the staff in so able and enthusiastic a commanding officer. She stated that during the four and a half years the hospital was open 45,000 sick and wounded soldiers had been under treatment in the wards. A bouquet was presented to Mrs. Thomson, and Dr. Thomson, in reply, said that the highest praise and honour to which any man could attain was the appreciation of his fellow workers.

THE LATE MR. G. C. SEARLE.—George Clement Searle, M.R.C.S., L.S.A., died at Totnes, Devon, on Dec. 16th last, in his seventy-fifth year. Mr. Searle was one of the best-known medical men in South Devon, and had practised at Brixham, Devon, for over 40 years, but had retired some years ago. He was formerly medical officer of health for Brixham, and held several other public appointments. Mr. Searle, who was a prominent Freemason, took great interest in all local matters, was at one time chairman of the School Board, and later chairman of the school managers at Brixham.

THE LATE DR. E. T. COX, OF HOVE.—Dr. Ernest Tom Cox, who died on Dec. 21st, 1919, at his residence in Hove, where he had been in practice for more than 25 years, was an Aberdeen medical graduate, taking his M.B., C.M. in 1889, and his M.D. four years later. He practised in association with various colleagues in the Hove district. Among a number of public appointments he was surgeon to the East Sussex Constabulary, and was a captain in the R.A.M.C. (T.). He had held the highest offices in several lodges of Freemasons, was the founder of one lodge and one of the original members of another, and had the distinction of being Provincial Grand Senior Warden in the Sussex Province. His death at 51 years of age will be widely felt in the district.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

ALDERSON, G. C., M.B., B.C., F.R.C.S. Eng., has been appointed Surgeon to the Coventry and Warwickshire Hospital.

BOWES, E. S., L.R.C.P., M.R.C.S., Medical Officer for the Totnes District and Workhouse, by the Totnes (Devon) Board of Guardians.

DOHERTY, M. A., M.B., M.R.C.S., Honorary Assistant Obstetrician to the Elizabeth Garrett-Anderson Hospital Euston-road.

ROSS, E. A., M.D. Cantab., M.R.C.P. Lond., Honorary Clinical Pathologist to the Royal Hampshire County Hospital, Winchester.

SMURTHWAITE, H., M.D., B.S. Durh., Assistant Surgeon to the Gloucestershire Royal Infirmary and Eye Institution.

TYLER, M. F., M.B., Medical Officer for the Dartmouth, Dittisham, and Kingswear District by the Totnes (Devon) Board of Guardians.

WAYLEN, G. H. H., B.Ch. Cantab., L.R.C.P., M.R.C.S., Medical Officer of the Third District and Workhouse Infirmary, by the Devizes (Wilts) Board of Guardians.

WILKINSON, A. G., M.B., Ch.B., D.P.H., D.T.M., Senior Medical Officer in Charge of the Tropical Section, Ministry of Pensions Hospital, Orpington, Kent.

Belfast Infirmary: HILL, T. E., M.B., B.Ch., B.A.O. Dub., House Surgeon; and HALL, R., jun., M.B., B.Ch., B.A.O. Belf., CLEARKIN, J. M., M.B., B.Ch., B.A.O. Belf., and WILSON, G., L.R.C.P. & S., L.M. Irel., House Physicians.

Certifying Surgeons under the Factory and Workshop Acts: TURNER, R. T., M.D. Vict. (Nantwich), WHITEHEAD, B., M.R.C.S., L.R.C.P. Lond. (Downton), JAMESON, J. E., M.B., B.Ch. Dub. (Kingston), CLEGG, E. A., M.R.C.S., L.R.C.P. Lond. (Gosport), SMITH, W. A., M.B., C.M. Aberd. (Darwen).

Vacancies.

For further information refer to the advertisement columns.

Birkenhead Borough Hospital.—Two Hon. Asst. M.O.'s.
Birkenhead Union.—Asst. Res. M.O. £300.
Birmingham, City Fever Hospital, Little Bromwich.—Asst. M.O. £300.
Birmingham General Hospital.—Clin. Path. £600.
Bournemouth, Royal Victoria and West Hants Hospital (Boscombe Branch).—Res. M.O. £200.
Bury Infirmary, Lancs.—Jun. H.S. £150.
Cape Town University, Faculty of Medicine.—Chair of Bio-Chemistry. £800.
Cardiff, King Edward VII. Hospital.—H.S. £300.
Carlisle, Cumberland and Westmorland Mental Hospital, Garlands.—Jun. Asst. M.O. £350.
Central London Throat and Ear Hospital, Gray's Inn-road, W.C.—Hon. Asst. Anæsth.
Charing Cross Hospital, W.C.—Orthop. S., Hon. Anæsth., and Three additional Hon. Anæsths.
Chester City and County.—Asst. M.O.H. £500.
Children's Infirmary, Cleveland-street, W.—Female Asst. M.O. £300.
City of London Union, Institution and Infirmary, 42, Clifden-road, Clapton, E.—Asst. M.O. £300.
Derby, Derbyshire Royal Infirmary.—Cas. O. £150. H.P. £200.
Dorchester, Dorset County Council Education Committee.—School Dentists. £400.
Eastern Dispensary, Leman-street, E.—Ophth. S.
Gilbert and Ellice Islands Colony and British Solomon Islands Protectorate.—Sen. M.O.'s. £600 each.
Gold Coast and Sierra Leone.—Dent. S. £500.
Great Northern Central Hospital, Holloway, London, N.—Two P.'s.
Greenwich Union Infirmary, Vanbrugh Hill, East Greenwich, S.E.—Asst. Med. Supt. £300.
Hartlepool Union.—Asst. Res. M.O. £350.
Hospital for Consumption and Diseases of the Chest, Brompton, S.W.—H.P. 30 guineas.
Hospital for Epilepsy and Paralysis and other Diseases of the Nervous System, Maida Vale, W.—Res. M.O. £150.
Hospital for Sick Children, Great Ormond-street, London, W.C.—H.S. £50.
Hospital for Women, Soho-square, W.—Clin. Assts.
Huddersfield County Borough Education Authority.—Asst. Sch. M.O. £475.
Hull Royal Infirmary.—H.P. £200.
Ilford Urban District Council.—Asst. M.O.H. £500.
Italian Hospital, Queen-square, W.C.—Hon. Anæsth. and Hon. Asst. Anæsth.
Lancaster, Royal Albert Institution for the Feeble-Minded.—Asst. M.O. £500.
Leeds General Infirmary.—Hon. Asst. S.
Londonderry County and County Borough Infirmary.—H.S. £250.
Lowestoft Borough.—Female M.O., &c. £500.
Macclesfield, Cheshire County Asylum, Parkside.—Asst. M.O. £350.
Maidstone, West Kent General Hospital.—H.P. £200.
Manchester, Whitworth Park Hospital.—H.S. £100.
Middlesex County Council, Napsbury Mental Hospital, near St. Albans.—Jun. Asst. M.O. £400.
Miller General Hospital for South-East London, Greenwich-road, S.E.—Res. Cas. O. and H.S. £100.
Ministry of Pensions.—Medical Referees.
Natal Provincial Administration—Med. Inspect. and Asst. Med. Inspect. of Schools. £800 and £600.
Neath Rural District Council.—M.O.H. £750.

Newcastle-upon-Tyne, Hospital for Sick Children.—Junior Res. M.O. £200.
Northumberland, County of.—School Med. Inspec. £400.
Norwich, Norfolk and Norwich Hospital.—Cas. O. £200.
Nottingham City Asylum.—Second Asst. M.O. £350.
Nottingham General Hospital.—Cas. H.S. £150.
Paisley, Burgh of.—M.O.H. £600.
Queen Mary's Hospital for the East End, Stratford, E.—Hon. S.
Reeth Union and Rural District Council, Yorkshire.—M.O.H., &c. £95.
Royal College of Surgeons of England.—Election to Court of Examiners.
Royal Free Hospital, Gray's Inn-road, W.C.—Female Res. Obst. O. (£110), Res. Obst. H.S. (£50), Res. Obst. Asst. (£150). Also Surg. Regist. and Clin. Assts.
Seamen's Hospital Society, Hospital for Tropical Diseases, Endsleigh Gardens, N.W.—Med. Supt. £400.
Sheffield University.—Demonstrator in Path. and Bact.
South London Hospital for Women, South Side, Clapham Common, S.W.—Female H.S. £100.
Stafford, Staffordshire General Infirmary.—H.P. £200.
Stockport Infirmary.—Jun. Res. M.O. £200.
Straits Settlements.—Res. M.O. £840.
Sunderland Education Committee.—Female Asst. Sch. M.O. and Two Sch. Dent. £450 each.
Surrey, Virginia Water, Holloway Sanatorium (Hospital for the Insane).—Female Jun. Asst. M.O. £300.
Swindon, Borough of.—Asst. M.O.H. £500.
University of London.—Chair of Path. at Middlesex Hosp. Med. Sch. £800.
Ventnor, Isle of Wight, Royal National Hospital for Consumption and Diseases of the Chest.—Asst. Res. M.O. £200.
Victoria Hospital for Children, Tite-street, Chelsea, S.W.—H.P. and H.S. Each £100.
Whittingham County Asylum, Preston, Lancs.—Asst. M.O. £420.

THERE are vacancies in the Mental Hospital Service of the London County Council for Fifth Assistant Medical Officers at Banstead, Cane Hill, and Long Grove Mental Hospitals, and for Sixth Assistant Medical Officers at Banstead, Bexley, Cane Hill, Claybury, Colney Hatch, Hanwell, and Long Grove Mental Hospitals.

THE Chief Inspector of Factories, Home Office, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Kidwelly, Kirkliston, Lerwick, and Mold.

Births, Marriages, and Deaths.

BIRTHS.

MCGRIGOR.—On Jan. 1st, at Streatham Manor, S.W., the wife of Major D. B. McGrigor, O.B.E., R.A.M.C., of a son.

SEARS.—On Dec. 29th, 1919, at "Point View," Burnt Ash Hill, Lee, S.E., the wife of C. Newton Sears, M.D., B.S. Lond., M.R.C.S., L.R.C.P., of a son.

WARWICK.—On Jan. 1st, at Regent's Park-road, the wife of A. Macgregor Warwick, M.C., M.B., of a daughter.

MARRIAGES.

NICOL—MURRAY.—On Dec. 18th, 1919, at British Embassy Chapel, Constantinople, by the Rev. Lieutenant-Colonel J. L. Findlay, D.S.O., Chalmers Nicol, Major, R.A.S.C., to Mary Dorothea Murray, M.B., Ch.B.

DEATHS.

CROSLAND.—On Dec. 31st, 1919, at New North-road, Huddersfield, Major George William Kilner Crosland, D.S.O., M.R.C.S., L.R.C.P., aged 50.

FRASER.—On Jan. 4th, at Drumsheugh-gardens, Edinburgh, Sir Thomas Richard Fraser, M.D., F.R.S., Emeritus Professor of Materia Medica, University of Edinburgh, Honorary Physician-in-Ordinary to the King in Scotland, aged 78.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

BOOKS, ETC., RECEIVED.

LIPPINCOTT (J. B.) COMPANY, London and Philadelphia.
The Art of Anæsthesia. By P. J. Flagg, M.D. 2nd ed. Pp. 367. 18s.

LIVINGSTONE, E. AND S., Edinburgh.
Half a Century of Smallpox (The Milroy Lectures, 1919). By J. C. McVail, M.D. Pp. 87. 5s. 6d.

LONGMANS, GREEN, AND CO., London.
The Oliver-Sharpey Lectures on the Feeding of Nations. By E. H. Starling, C.M.G., M.D. Pp. 146. 5s.

MACLEHOSE, JACKSON, AND CO., Glasgow.
Fractures, Compound Fractures, Dislocations, and their Treatment, with a Section on Amputations and Artificial Limbs. By J. A. C. Macewen, Capt., R.A.M.C. (T.F.). Pp. 285. 12s. 6d.

ROUTLEDGE, GEORGE, AND SONS, London.
Totem and Taboo. By Prof. S. Freud. Authorised translation by A. A. Brill, M.D. Pp. 268. 10s. 6d.

SCIENTIFIC PRESS, THE, London.
Change of Life: Its Difficulties and Dangers. By Dr. Mary Scharlieb. Pp. 123. 1s. 3d.

UNIVERSITY OF LONDON PRESS, LTD., London.
Diseases of Women. By T. G. Stevens, M.D., B.S. 2nd ed. Pp. 443. 20s.

UNIVERSITY PRESS, Cambridge and London.
The Transmutation of Bacteria. By S. Gurney-Dixon, M.D. Pp. 180. 10s.

WITHERBY AND CO., London.
Meteorology for All. By D. W. Horner, F.R.Met.Soc. Pp. 184. 6s.

Medical Diary.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Tuesday, Jan. 13th.

PSYCHIATRY (Hon. Secretaries—Bernard Hart, G. F. Barham) at 5 P.M.
Papers:
Dr. E. W. Scripture: The Nature of Epilepsy.
Dr. H. Crichton Miller: The Rôle of the Endocrines in the Production of Mental Disorder.

Wednesday, Jan. 14th.

HISTORY OF MEDICINE (Hon. Secretaries—Arnold Chaplin, F. G. Crookshank): at 5 P.M.
Papers:
Mr. S. P. Vivian: Thomas Campion, Doctor of Phisicke, 1567–1620.
Canon Westlake: The Gild of our Lady of Rouncyval.

Thursday, Jan. 15th.

DERMATOLOGY (Hon. Secretary—Henry MacCormac): at 5 P.M.
Cases: (4.30 P.M.) will be shown by—
Dr. H. W. Barber: Recurrent Ulceration of the Skin, apparently due to a Diphtheroid Bacillus; and others.

Friday, Jan. 16th.

OTOLOGY (Hon. Secretaries—H. Buckland Jones, Lionel Colledge); at 5 P.M.
Short Paper:
Dr. A. A. Gray: A Few Anatomical Details of the Anatomy of the Vestibule, not previously described.
Cases and Specimens will be shown by—
Mr. E. D. D. Davis, Mr. J. S. Fraser and Dr. J. K. Milne Dickie, Mr. Somerville Hastings, Mr. Richard Lake, and others.

ELECTRO-THERAPEUTICS (Hon. Secretaries—Walter J. Turrell, Stanley Melville): at 8.30 P.M.
Paper:
Mr. C. Thurstan Holland: Lessons of the War.

THE TUBERCULOSIS SOCIETY AND THE ASSOCIATION OF SCHOOL MEDICAL OFFICERS (JOINT MEETING), at the Rooms of the Medical Society, 11, Chandos-street, Cavendish-square, W.
MONDAY, Jan. 12th.—7.30 P.M., Adjourned Discussion on the Various Aspects of Tuberculosis as Affecting Child Life. Lieut.-Col. F. W. Higgs, C.B.E., Lieut.-Col. Lætitia Fairfield, C.B.E., Dr. Jane Walker, Dr. Watt, and others are expected to take part in the discussion.

RÖNTGEN SOCIETY, at the Royal Photographic Society's House, 35, Russell-square, W.C.
TUESDAY, Jan. 13th.—7 P.M., General Meeting. Discussion on Some Aspects of Radiology and Radiometallography, opened by Major G. W. C. Kaye, O.B.E.

SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 11, Chandos-street, Cavendish-square, W.
FRIDAY, Jan. 16th.—8.30 P.M. Discussion on Bacillary Dysentery, opened by Dr. P. Manson-Bahr.—Paper:—Read for Dr. T. Clarke (Penang): Fleas as the Probable Carriers of Rheumatic Fever.—Read for Dr. F. Roux: Note on the Treatment of Malaria and Blackwater Fever.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

UNIVERSITY OF LONDON.
Advanced Lectures in Physiology to Students of the University and others interested in the subject.
A Course of Eight Lectures on the Regulation of Respiration will be given by Dr. M. S. Pembrey and Mr. J. H. Ryffel at Guy's Hospital, Borough, S.E.
THURSDAY, Jan. 15th.—4.30 P.M., Lecture II.

LONDON HOSPITAL MEDICAL COLLEGE (UNIVERSITY OF LONDON), Mile End, E.
A Course of Instruction on the Diseases of Children, open to Post-Graduates and to Students of the Hospital. (The lectures will be illustrated by lantern slides.)
MONDAY, Jan. 12th.—9.15 A.M., Lecture I.:—Dr. Thompson: Organic and Functional Nervous Diseases, Meningitis and Mental Deficiency. (At the Anatomical Theatre.)
WEDNESDAY.—10 A.M., Clinical Demonstration:—Dr. Miller. (At the Children's Out-patient Department.)
SATURDAY.—10.15 A.M., Lecture II., Dr. Hutchison: General Diseases. (At the Anatomical Theatre.)

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.
TUESDAY, Jan. 13th.—4.30 P.M., Opening Address:—Sir Humphry Rolleston, K.C.B.: The Uses and Methods of Application of Post-Graduate Teaching.

NATIONAL HOSPITAL FOR DISEASES OF THE HEART POST-GRADUATE COURSE, Westmoreland-street, W.
MONDAY, Jan. 12th.—11 A.M., Out-patients: Dr. Goodall. 2 P.M., In-patients: Dr. Moon.
TUESDAY.—2 P.M., Out-patients: Dr. R. Wells. 3 P.M., In-patients: Dr. Gibbes.
WEDNESDAY.—2 P.M., Out-patients: Dr. Moon. 5.30 P.M., Lecture:—Dr. Hamill: Præcordial Pain.
THURSDAY.—10 A.M., In-patients: Dr. Hamill: 2 P.M., Out-patients: Dr. Price.
FRIDAY.—2 P.M., Out-patients: Dr. Gibbes. 2.30 P.M., In-patients Dr. Wells.
SATURDAY.—10.30 A.M., In-patients: Dr. Hamill.

ROYAL INSTITUTE OF PUBLIC HEALTH, in the Lecture Hall of the Institute, 37, Russell-square, W.C.

Special Course of Lectures and Demonstrations on Tuberculosis for Medical Men and Women qualifying to become Tuberculosis Officers, General Practitioners, and others. Bacteriological Demonstrations will be given in the Laboratories of the Institute, and visits arranged to Sanatoriums, Tuberculosis Dispensaries, &c.

THURSDAY, Jan. 15th.—5 P.M., Lecture I.:—Prof. E. W. Hope: Schemes and Methods in Tuberculosis Work.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE CLINIC.

TUESDAY, Jan. 13th.—4.30 P.M., Lecture:—Mr. E. D. Telford: Treatment of Spinal Caries.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, Queen-square, W.C. 1.

MEDICAL SCHOOL.

MONDAY, Jan. 19th.—2–3.30 P.M., Out-patient Clinic: Dr. Collier. 3.30 P.M., Dr. S. A. Kinnier Wilson: Examination of the Nervous System and Interpretation of Physical Signs. I.

TUESDAY, Jan. 20th.—2–3.30 P.M., Out-patient Clinic: Dr. Grainger Stewart. 3.30 P.M., Ward Cases: Dr. James Taylor.

WEDNESDAY, Jan. 21st.—2 P.M., Mr. Scott: Tinnitus aurium. 3.30 P.M. Dr. Greenfield: Pathological Demonstration.

THURSDAY, Jan. 22nd.—2–3.30 P.M., Out-patient Clinic: Dr. Farquhar Buzzard. 3.30 P.M., Dr. S. A. Kinnier Wilson: Examination of Nervous System and Interpretation of Physical Signs. II.

FRIDAY, Jan. 23rd.—2–3.30 P.M., Out-patient Clinic: Dr. Gordon Holmes. 3.30 P.M., Ward Cases: Dr. Hinds Howell.

SATURDAY, Jan. 24th.—9 A.M., Surgical Operations.

Fee for Post-Graduate Course £5 5s. C. M. HINDS HOWELL, Dean.

Communications, Letters, &c., to the Editor have been received from—

A.—Capt. H. St. A. Agate, Portsmouth.

B.—Messrs. Burroughs Wellcome and Co., Lond.; British Science Guild, Lond., Sec. of; British Medical Association, Victorian Branch, Sec. of; Mr. H. A. Barker, Lond.; Dr. F. A. Bainbridge, Lond.; Mrs. C. Brereton, Lond.; Miss E. Britten, Lond.; British Federation of Medical and Allied Societies, Lond.; Dr. R. D. Batten, Lond.

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E.—Dr. A. Erdös, Nagyvarad; Epsom College Lond., Sec. of.

F.—Factories, Chief Inspector of, Lond.

G.—Mr. J. Good, Kettering; Dr. S. R. Gloyne, Lond.; Dr. J. P. Gray, Exeter; Dr. H. O. Gunewardene, Lond.

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I.—*Infinito*, Dumfries, Editor of.

J.—Dr. E. L. Jones, Cambridge.

L.—Messrs. H. K. Lewis and Co., Lond.

M.—Dr. P. Manson-Bahr, Lond.; Medical Research Committee, Lond.; Ministry of Health, Lond.; Dr. O. May, Lond.; Mr. R. Macdonald, Leicester; Prof. C. S. Myers, Lond.; Mr. A. MacDonald, Washington; Dr. C. G. MacVicker, Street.

N.—North-East London Post-Graduate College, Dean of; National Hospital for the Paralysed and Epileptic, Lond., Dean of.

O.—Oxo, Ltd., Lond., Managing Director of; Ophthalmological Society of the United Kingdom, Hon. Sec. of; Mr. D. F. A. O'Brien, Bradford.

P.—Mr. L. Paton, Lond.; Dr. A. Pettit, Paris; *The Prescriber*, Lond., Editor of; Mr. A. C. Perry, Lond.; Miss L. M. Potter, Lond.; Dr. W. A. Potts, Edgbaston; Mr. J. Powell, St. Helier.

Q.—Queen's Hospital for Children, Lond.

R.—Dr. H. M. Rainsford, Lond.; Sir H. D. Rolleston, Lond.; Sir G. A. Reid, Southsea; Dr. J. D. Rolleston, Lond.; Dr. J. W. Rob, Weybridge.

S.—Mr. A. B. Searle, Sheffield; Dr. C. F. Sonntag, Lond.; Société de Biologie, Paris; St. George's Hospital, Lond., Secretary-Superintendent of; Society for the State Registration of Trained Nurses, Lond., Hon. Sec. of; "Special Reserve."

T.—Dr. W. H. M. Telling, Leeds; Dr. W. R. M. Turtle, Lond.; Dr. A. H. Thompson, Lond.; Dr. W. W. D. Thomson, Belfast; Dr. H. Townsend-Whitling, Market Harborough.

U.—Under-Secretary of State for the Colonies, Lond.

W.—Sir C. G. Watson, Lond.; Dr. E. Watt, Edinburgh; Dr. F. P. Weber, Lond.; Dr. W. McC. Wanklyn.

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THE MEDICAL PROFESSION AND THE PEERAGE.

BY S. D. CLIPPINGDALE, M.D.

Sir Bertrand Dawson's elevation to the peerage lends interest to the question how far the medical profession and the peerage have hitherto been associated by either actual grant or direct descent. A glance over the authorities reveals the following instances, no claim being implied that the list is complete.

Addington (*Sidmouth*).—The first Viscount Sidmouth, Speaker of the House of Commons in the time of George III., was son of Dr. Henry Addington, of Upper Ottery, co. Devon.

Alexander (*Burgh*).—Dr. Reginald Gervaise Alexander succeeded on July 20th, 1919, in establishing to the satisfaction of the House of Lords his claim to be co-heir to the ancient barony of Burgh, created in 1437, his claim to be co-heir also to the dormant baronies of Cobham and Strabolgi being reserved for future consideration.

Barwick (*Sherbourne*).—The only daughter and heiress of Dr. Peter Barwick, physician to Charles I. and Charles II., and one of the few doctors who remained in London during the Great Plague, by marrying Sir Ralph Dutton of Sherbourne became ancestress of the Duttons, Barons Sherbourne.

Bickersteth (*Langdale*).—Henry Bickersteth, son of a surgeon practising in Kirkby Lonsdale, was himself first a physician (M.D. Camb.), then a lawyer. Rising in the latter capacity to the position of Master of the Rolls, he, in 1836, was created Baron Langdale. This peerage is now extinct.

Bray (*Braye*).—Sir Richard Bray, said to have been physician to Henry VI., and who lies interred at Worcester Cathedral, was grandfather of Sir Edmund Bray, summoned to Parliament as Baron Bray, 21 Henry VIII., ancestor of the present Lords Braye of Eaton Braye.

Dalrymple (*Stair*).—The Hon. Thomas Dalrymple, M.D., physician in Scotland to King William and Queen Mary, was son of the first Viscount Stair.

De Fernham (*Durham*).—Nicholas de Fernham, physician to Henry III., becoming weary of Court life, retired, and, being an ecclesiastic, was made Bishop of Durham.

Denman (*Denman*).—Baron Denman, of Dovedale, Lord Chief Justice of England from 1832 to 1850, was the son of an eminent obstetric physician, Dr. Thomas Denman.

Douglas (*Glenbervie*).—Sylvester Douglas, who studied medicine at Aberdeen and afterwards practised as an apothecary, exchanged physics for politics, and, becoming eminent as a diplomatist, was, in 1800, raised to the Irish Peerage by the title of Baron Glenbervie, on which occasion Sheridan wrote:—

> "Glenbervie, Glenbervie!
> What's good for the scurvy?
> Let your old trade ne'er be forgot,
> For arms you should quarter
> A pestle and mortar,
> And for crest take a spruce gallipot."[1]

Fairfax (*Fairfax of Cameron*).—John Contée Fairfax, M.D., of Fairfax County, Virginia, a large landed proprietor, was eleventh Baron Fairfax of Cameron in the Peerage of Scotland, a 1627 creation.

Finlay (*Finlay*).—Sir Robert Bannatyne Finlay graduated in medicine at Edinburgh University before his call to the Bar in 1867. He became Lord Chancellor in 1916, with a barony for his lifetime.

Foster (*Ilkeston*).—The Right Honourable Sir Walter Foster, M.D., was in 1910 created Baron Ilkeston of Ilkeston, in the county of Derby.

Holland (*Knutsford*).—The eldest son of Sir Henry Holland, Bart., Physician to Queen Victoria, was, in 1895, created Viscount Knutsford.

Howard (*Wicklow*).—Dr. Ralph Howard, President of the Royal College of Physicians, Ireland, in 1674, acquired from the Duke of Ormonde the estate of North Arklow, co. Wicklow. This estate was confiscated by James II., but restored by William III., and the doctor's grandson created Viscount Wicklow and Baron Clonmore.

James (*James of Hereford*).—The late Baron James of Hereford was the son of Mr. Philip Turner James, surgeon, of Hereford.

Lister (*Lister*).—The great surgeon was raised to the peerage as Baron Lister of Lyme Regis, in the county of Dorset, Feb. 6th, 1897. He left no heir to the barony.

Lister (*Ribblesdale*).—The Listers, Barons Ribblesdale, can claim for their pedigree three notable medical men, Dr.

[1] Moore's Life of Sheridan.

Edward Lister, physician to Queen Elizabeth; Sir Mathew Lister, physician to James I.; and Dr. Martin Lister, physician to Queen Anne.

Morley (*Morley of Blackburn*).—Viscount Morley of Blackburn is the son of Mr. Jonathan Morley, surgeon, of Blackburn.

Pemberton (*Kingsdown*).—Edward Pemberton, M.D., of Warrington, was grandfather of the first Baron Kingsdown, a peerage now extinct.

Playfair (*Playfair*).—The first Baron Playfair, of St. Andrews, in the county of Fife, so created in 1892, was the son of Dr. George Playfair, Inspector-General of Hospitals, Bengal.

Primrose (*Rosebery*).—The Earl of Rosebery, Hon. F.R.C.S. Eng. and Edin., is the lineal descendant of Gilbert Primrose, or Prymross, surgeon to James I. and VI., and first President of the Royal College of Surgeons, Edinburgh. At the recent tercentenary celebration of the college Lord Rosebery, who attended, exhibited the pestle and mortar which had belonged to his medical ancestor.

Petty (*Shelburne*), *Petty* (*Lansdowne*).—Sir William Petty, who was physician to Charles I., and whose wife was created Baroness Shelburne, had two sons, who became first and second Barons Shelburne respectively. They died, however, without issue. Sir William's daughter and heiress married Thomas Fitzmaurice, Earl of Kerry, and so created the Petty-Fitzmaurice family, of which the present Marquis of Lansdowne (Sir Charles Petty-Fitzmaurice) is the representative. Concerning this marriage a cynical member of the family said that the doctor's daughter brought into it "whatever degree of sense may have appeared in it and whatever wealth is likely to remain in it."

Sanders (*Melville*), *Sanders* (*Westmorland*).—Dr. Richard Huck Sanders, physician to the forces in the reign of George III., left two daughters, co-heiresses of his wealth. The elder of these ladies married the second Viscount Melville and became ancestress of the succeeding Viscounts Melville. The younger lady became the second wife of the tenth Earl of Westmorland, whose honours, however, descended to the issue of his first wife.

Singe-Hamilton (*Abinger*).—The Honourable Mrs. Singe-Hamilton, M.D., the first lady member of the peerage to become a member of the medical profession, is a daughter of the third Baron Abinger.

Sloane (*Cadogan*).—Sir Hans Sloane's daughter married the second Baron Cadogan, to whom she conveyed the Manor of Chelsea, purchased by her father as a result of his successful practice.

Smithson (*Northumberland*).—Sir Hugh Smithson, Bart., who had practised as an apothecary in Hatton Garden, having married the Percy heiress was created, in 1749, Earl, and, in 1766, Duke of Northumberland.

Somerville (*Somerville*).—Dr. William Somerville, husband (and cousin) of Mary Somerville, the talented authoress, and physician to Chelsea Hospital, was directly descended from the Barons Somerville of Cambusnethan, ennobled as early as 1442.

In addition to these, Dr. Bathust, physician to Oliver Cromwell, and Sir William Waldegrave, physician to James II., are known to have been members of the Bathust and Waldegrave peerage families, respectively, but their position in the pedigrees of those families is not clear.

THE NEW DISABLEMENT PENSIONS.

A FURTHER report of the Select Committee on Pensions issued on the last day of 1919 (H.M. Stat. Office, price 3*d*.), suggests a generous increase in the scale of disablement pensions for officers and for the dependents of both officers and men.

The recommendation contained in the first report of the Select Committee (July 28th, 1919) that soldiers' pensions should, like sailors', be awarded as a statutory right and not by way of bounty was accepted by the Government, and is embodied in the War Pensions Act of 1919. The exclusion of widows and dependents from the statutory recognition, since found to be a hardship, will be made good if the recommendation contained in the present report is put in force.

The War Office, the Admiralty, and the Air Ministry have recently issued new Orders improving the rates of service retired pay. The present report reconsiders the provisions for disability in the light of these new regulations. Officers who have already served in the war and retired prior to September, 1919, are given the benefit of the new rates. The new service rates professedly allow for the increased cost of living, and are to be subject to revision after five years to an extent not exceeding 20 per cent., and thereafter at intervals of three years.

The report proceeds:—

> The natural basis to take for officers qualified for service retired pay is the new scales of such retired pay. But these scales only apply in the case of the Army to those with 15 years' service, and in the case of the Navy and Air Force to those who are 40 years of age and over. For officers not so qualified we propose to take as a basis: (i.) for the Army and Air Force, £200 for a Lieutenant-Colonel, £170 for a Major, and for Captains and Subalterns a graduated scale graded down from £140 for 14 years' service, and with a minimum of £120 for a Captain and £70 for a Lieutenant and 2nd Lieutenant; and (ii.) for Lieutenants and Lieutenant-Commanders of the Navy the new invaliding scale varying with service in the rank laid down in the Admiralty Order.
>
> There is no provision in the Admiralty Order either for Sub-Lieutenants or for Commanders of the Royal Navy. To meet the difficulty we recommend that £70 be the scale for the Sub-Lieutenant, thus placing him on an equality with the Lieutenant of the Army, to whom he corresponds in rank, and for the Commander the new invaliding scale applicable to Lieutenant-Commanders with increments of £10 for each year of service on the date of promotion to Lieutenant-Commander and a flat-rate addition of £50 for rank.
>
> As to the addition to be made for disablement, the present addition is £100 for 100 per cent. disablement; but to this at present must be added the 20 per cent. war bonus reckoned on the temporary officers' scales, which amount to £35 for 100 per cent. disablement in the case of a Captain or Subaltern, £45 in the case of a Major, and £50 in the case of a Lieutenant-Colonel. So far as the retired pay element is concerned, bonus may now be regarded as included in the new basic scales. But so far as the disablement element is concerned, it is necessary to augment this, and we recommend an increase of the present scale by 50 per cent., making it £150 for 100 per cent. disablement, and that a proportionate addition be made for the lower grades.
>
> The new Army rates of half-pay show a very great increase, and we recommend that for regular officers of the Army these rates, without any additions, should be accepted as minimum rates for disability. They will be liable to adjustment after five years, and should be limited to the substantive rank held by the officer at the time of his retirement.

The result of the foregoing recommendations will be to make the disablement pensions to be awarded to regular officers as shown in the following table:—

TABLE A.—ARMY.

Rank.	Total service.	Service in rank.	Present.	Proposed.
			£	£
I.—*100 per cent. Disablement.*				
2nd Lieut....	4	4	210	220
Lieut.	9	7	235	240
Captain ...	6	2	263	270
,, ...	15	3	285	300
Major	10	2	300	320
,, ...	18	2	300	360
,, ...	21	5	300	450
Lt.-Col. ...	23	2	350	600
II.—*60 per cent. Disablement.*				
2nd Lieut....	4	4	136	160
Lieut.	9	7	181	181
Captain ...	6	2	209	214†
,, ...	15	3	241	241
Major	10	2	260	287†
,, ...	18	2	277	309
,, ...	21	5	287	390
Lt.-Col. ...	23	2	310	540
III.—*30 per cent. Disablement.*				
2nd Lieut....	4	4	95	118†
Lieut.	9	7	140	173†
Captain ...	6	2	167	214†
,, ...	15	3	200	238†
Major	10	2	216	287†
,, ...	18	2	233	287†
,, ...	21	5	243	345
Lt.-Col. ...	23	2	290	495

TABLE B.—NAVY.

Rank.	Total service.	Service in rank.	Present.	Proposed.
			£	£
I.—*100 per cent. Disablement.*				
Sub-Lieut.	3	3	210	220
Lieut.	7	5	245	300
Lt.-Comr. (age 34)	14	3	300	360
Lt.-Comr. (age 42)	21	10	425	570
Commander (age 34)	14	3*	328	410
Commander (age 42)	21	7	430	570
II.—*60 per cent. Disablement.*				
Sub-Lieut.	3	3	144	160
Lieut.	7	5	191	240
Lt.-Comr. (age 34)	14	3	242	300
Lt.-Comr. (age 42)	21	10	367	510
Commander (age 34)	14	3*	273	365†
Commander (age 42)	21	7	370	510
III.—*30 per cent. Disablement.*				
Sub-Lieut.	3	3	103	115
Lieut.	7	5	150	195
Lt.-Comr. (age 34)	14	3	198	292†
Lt.-Comr. (age 42)	21	10	323	465
Commander (age 34)	14	3*	225	365†
Commander (age 42)	21	7	325	465

* Includes service as Lieutenant-Commander. † Half-pay rates.

The rates for temporary officers disabled in the late war work out in the case of 100 per cent. disablement at amounts varying from £210 for the 2nd Lieutenant to £300 for the Lieutenant-Colonel.

In regard to disability and deaths as a result of earlier campaigns, the report accepts the principle that those disabled in previous wars and their dependents, both officers and men, should, if already in receipt of disablement pension or allowance, receive the benefit of all the improved rates granted to officers and men and their dependents in the present war.

BOOKS OF REFERENCE.

THE fifty-second annual issue of *Whitaker* (1920. 12, Warwick-lane, London. Pp. 1020. 6*s*.) reverts to the more complete enumeration of facts and figures which characterised it in the pre-war days; the Service lists again appear, and statistics which would have given information

to the enemy are reintroduced. New Government departments are also to be found in this volume, and the Ministry of Health receives liberal treatment in the way of reference. At this time of day there is no need to describe the contents of *Whitaker*, but mention may be made of a new section dealing with "Questions of the Day" and of special articles devoted to sport, workmen's compensation, meteorology, women's work, aviation and science and invention, and an improved and extended section on banking. For the rest the book is still the indispensable work of reference it has always been.

The *New Hazell Annual and Almanack, 1920* (Edited by T. A. Ingram, LL.D. London: Henry Frowde and Hodder and Stoughton. Pp. 940. Price 6s.), is another book which, on account of its utility, finds a place in every office and library, containing the most recent and authoritative information concerning the British Empire, the nations of the world, and the important topics of the day. Among the new features of the present issue are the articles on the peace treaties with Germany, Austria, and Bulgaria, which are fully dealt with, while the text of the Covenant of the League of Nations is set out in full, as well as Labour's Charter under the League. The article on Pensions and Separation Allowances treats the subjects very fully. Scientific and industrial research also receive attention, and among the maps which illustrate the *Annual* are two showing the new Germany and the new Austria.

LONGEVITY.

IN the *Evening News* (London) of Dec. 29th, 1919, there appears a reproduction of a tablet on a wall of the parish church of Shifnal, Salop, showing two instances of extraordinary longevity. The first name on the tablet is that of William Wakley, who was born on May 1st, 1590, and was buried on Nov. 28th, 1714, being therefore 124 years of age. The date and place of his baptism and burial appear to have been verified. This William Wakley was believed by the late Mr. Thomas Wakley, senior, to have been his grandfather's grandfather, and the dates make the theory just possible, crediting William and the two succeeding generations with unusual prolongation of vigour. The Thomas Wakley who founded THE LANCET was born in 1795, his father, Henry, of Membury, having been born in 1750.

THE POSITION OF BRITISH BUTTER.

DAIRY products include butter and cheese (and rarely milk-sugar), and the starting-point of all is, of course, milk. In the time of plentiful supplies or of an excessive output the manufacture of these products is an economically sound proceeding, though we cannot understand why the milk-sugar is seldom recovered but lost in the whey, though it is the most abundant solid constituent of milk, the proportions being—milk-sugar 5 to 6 per cent., casein (cheese) 3·3 per cent., and fat (cheese and butter) 3·5 to 4 per cent. With a shortage of milk and high prices ruling the raw material in its entirety goes to the consumer, and British cheese and butter-making are for the time in abeyance. That is why no butter has been made in this country for some time, and what little butter is available for distribution comes from sources beyond these shores. So long as milk remains at its present inflated price the dairy industry will discard the making of solid milk products, unless a very high price is offered for them. Imported butter is still controlled and rationed, and these regulations are to be continued, but British butter is to be relieved from control in February. With milk realising a price of 3*s.* 3*d.* per gallon to the producer, the chances are that when the restriction in regard to the supply of British butter is withdrawn its price may mount to anything.

PUBLIC HEALTH AT GIBRALTAR IN 1918.

THE total civil population of Gibraltar is estimated to be 17,963, of whom 14,511 dwell in "the city," giving a density of 139 persons per acre in this area. The density of population in London, within the area dealt with by the Registrar-General, was in 1911 at the rate of 60·43 per acre. The borough of Bethnal Green had a density of 173 per acre. Gibraltar, therefore, though extremely crowded, is not in a worse condition in this respect than some town populations in our own country. But about 10,000 aliens and 1500 British residents in La Linea (the nearest point in Spain, about half a mile to the north across the neutral ground) come into the city daily for the purposes of their employment. As regards infectious diseases, the total number of cases was 159. Of enteric fever there were 31 cases and 3 deaths and of measles 25 cases and 2 deaths. The total zymotic death-rate only amounted to 0·455 per 1000. Colonel G. Dansey-Browning, C.B.E., A.M.S., who presents the report, as medical officer of health, draws special attention to the incidence of pulmonary tuberculosis, of which there were 39 cases with 37 deaths. The cases were more numerous than in either of the three preceding years, and the number of deaths greater than in any year of the decennium (1909–1918). He considers the figures to be very unsatisfactory, and to show that the marked improvement which coincided with better housing in the last decade has not been maintained. The administrative measures adopted in regard to this disease are admirable. Each case notified is inquired into, the needful precautions in regard to infection are explained, assistance given if necessary, both in the way of food, &c., and by accommodation of the patient at the tuberculosis home, or by treatment at the dispensary. The average monthly number of patients attending the dispensary was 49, and the average monthly number of visits paid to the patients' homes was 40; while five families have been provided with free quarters at the home, and 75 families assisted with food, and with money if needed. Of the 31 enteric cases, 9 had probably contracted infection in Spain, 7 from contact with persons suffering from the disease in Gibraltar, 2 from eating shell-fish, and 3 from drinking polluted water. The alien water-seller, from whom these last-mentioned cases had been infected, happened to meet with an accident, and on admission to hospital was found to be suffering from ambulatory typhoid. All water-sellers now have to be examined and licensed. There was an entire absence of Mediterranean fever amongst the civil population for the first time since 1908; one soldier developed the disease three weeks after drinking brandy diluted with goat's milk whilst on pass in Spain. Since 1906 no goats have been allowed to be imported unless they are proved to have come from a non-infected herd, and all milk imported from Spain is boiled before being sold. Gibraltar suffered from two epidemics of influenza in 1918; these form the subject of a special report. The first outbreak lasted from the latter half of May to the beginning of July—that is, during the hot, dry weather—and was of a mild character; 8 deaths were recorded from influenza and 13 from pneumonia—21 in all. Colonel Dansey-Browning considers that the actual number of cases cannot have been less than 800. The second epidemic, from the beginning of September to the end of November, was much more severe; there were 76 deaths from influenza and 36 from pneumonia — 112 in all. Toxæmia, with or without albuminuria, was a frequent symptom; the actual number of cases is estimated to have been 6000—"that is to say, over 30 per cent. of the total civil population suffered in some form or other from influenza in 1918." Isolation, free ventilation, and disinfection were found to be effectual in checking spread. In the second period it became necessary to prohibit indoor public assemblies and wakes, and to restrict funeral ceremonies in churches. Colonel Dansey-Browning's report is very concise, and fully illustrated by tables of statistics in detail. It is evident that the greatest watchfulness is maintained over the sanitation of the fortress and city, and the health of the civil and military population.

THE TOXICITY OF WOOD ALCOHOL.

THE remarkable toxic properties of wood alcohol (methyl alcohol), referred to in our issue last week, claim wider attention, and there appears to be considerable misconception as to what wood alcohol really is. At all events, pure wood alcohol (CH_3OH) is not readily accessible to the public; in its more or less pure form it is used as a solvent for waxes and varnishes by the chemical manufacturer, by the analytical chemist, and by the microscopist in the preparation of certain aniline stains. Methylated spirit as we know it, and as it is employed in spirit lamps, is not wood alcohol, but a mixture of ordinary alcohol (ethyl) with an addition of 10 per cent. wood alcohol and a small quantity of mineral naphtha (light paraffin oil). The presence of the oil is shown on adding water to the spirit when it turns milky through separation of the oil. It is thus called "mineralised" or "denaturalised," but still contains about 90 per cent. of alcohol (ethyl) or rectified spirit, the chief factor of potable spirit. It is not usually the case that the lowest member of an homologous series is more toxic than its higher molecular relatives. Propyl alcohol (C_3H_7OH), for example, is more powerful than ethyl (C_2H_5OH), butyl (C_4H_9OH) than propyl, and amyl ($C_5H_{11}OH$) than any of them, and so the toxicity advances as CH_2 is added. According to Cushny, the symptoms of wood alcohol poisoning in man differ from those of ordinary spirits in the marked muscular weakness and defective cardiac action, which are followed by nausea, vomiting, coma, or delirium of a much more intense and persistent character than those seen in intoxication with ethyl alcohol. In a considerable number of cases the same observer records that death has followed from a single dose smaller than would have been fatal had ethyl alcohol been taken, and in some cases total and permanent blindness has followed or accompanied recovery. It is suggested that while ethyl alcohol undergoes complete combustion in the tissues, methyl alcohol is oxidised to formic acid and possibly to formic aldehyde, both of which are much more poisonous than the original alcohol. This explanation is plausible, so that the intense toxicity of methyl alcohol compared with that of ethyl alcohol may be due to incomplete combustion, just as poisonous carbon monoxide is given off by an imperfectly working fire or stove.